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Cruise Details and Biological Observations from Rockfish Charters to the West Coast of Vancouver Island Aboard the *F/V HOWE BAY*, July 24-31 and August 24-29, 1985 and the *F/V ARCTIC OCEAN*, July 28-August 5, 1986

R. D. Stanley

Department of Fisheries and Oceans
Fisheries Research Branch
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6

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CRUISE DETAILS AND BIOLOGICAL OBSERVATIONS FROM ROCKFISH CHARTERS TO THE WEST COAST OF VANCOUVER ISLAND ABOARD THE F/V HOWE BAY, JULY 24-31 AND AUGUST 24-29, 1985 AND THE F/V ARCTIC OCEAN, JULY 28-AUGUST 5, 1986

by

R. D. Stanley

Department of Fisheries and Oceans
Fisheries Research Branch
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6

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ABSTRACT

Stanley, R. D. 1988. Cruise details and biological observations from rockfish charters to the west coast of Vancouver Island aboard the F/V HOWE BAY, July 24-31 and August 24-29, 1985 and the F/V ARCTIC OCEAN, July 28-August 5, 1986. Can. MS Rep. Fish. Aquat. Sci. 1981: 77 p.

DFO staff conducted three rockfish charters to the west coast of Vancouver Island in 1985 and 1986. Two were conducted aboard the F/V HOWE BAY, July 24-31 and August 24-29 in 1985. The 1986 cruise was conducted aboard the F/V ARCTIC OCEAN, July 28-August 5. The purpose was to collect biological information on the stocks of silvergray rockfish (Sebastes brevispinis) and canary rockfish (Sebastes pinniger). Twenty-nine samples of silvergray rockfish and seven samples of canary rockfish were collected. Observations collected during the cruises revealed that parturition for silvergray rockfish terminates during August and early September in this area. The copepod parasite Sarcotaces arcticus was present in 2.5% of the silvergray rockfish and in none of the canary rockfish. Prevalence was equal between sexes but decreased with increasing size of silvergray rockfish. Infection appeared to be associated with a lower likelihood of spawning. Prevalence was significantly lower in 1986 than in 1985.

RÉSUMÉ

Stanley, R. D. 1988. Cruise details and biological observations from rockfish charters to the west coast of Vancouver Island aboard the F/V HOWE BAY, July 24-31 and August 24-29, 1985 and the F/V ARCTIC OCEAN, July 28-August 5, 1986. Can. MS Rep. Fish. Aquat. Sci. 1981: 77 p.

En 1985 et 1986, le personnel du MPO a organisé trois expéditions d'étude des scorpènes sur la côte ouest de l'Île Vancouver. Deux ont été réalisées en 1985 à bord du HOWE BAY du 24 au 31 juillet et du 24 au 29 août. L'expédition de 1986 a été effectuée à bord du ARCTIC OCEAN, du 28 juillet au 5 août. Le but était de recueillir des données biologiques sur les stocks de sébaste argenté (Sebastes brevispinis) et de sébaste canari (Sebastes pinniger). On a recueilli vingt-neuf échantillons de sébaste argenté et sept échantillons de sébaste canari. Les observations recueillies au cours des expéditions ont révélé que la parturition chez le sébaste argenté se termine en août et au début septembre dans ce secteur. On a trouvé le copépode parasite Sarcotaces arcticus chez 2,5% des sébastes argentés mais dans aucun spécimen de sébaste canari. La fréquence était la même pour les deux sexes mais diminuait avec l'accroissement de taille des sébastes argentés. L'infestation semblait être liée à une plus faible probabilité de fraie. La fréquence a été significativement plus faible en 1986 qu'en 1985.

INTRODUCTION

Research staff from the Biological Sciences Branch of the Department of Fisheries and Oceans, Canada conducted rockfish charters to the west coast of Vancouver Island in 1985 and 1986. The charters were conducted aboard the commercial vessels F/V HOWE BAY in 1985, from July 24-31 and August 24-29, and aboard the F/V ARCTIC OCEAN in 1986, from July 28-August 5.

The purpose of the cruises was to collect biological information on silvergray rockfish (Sebastes brevispinis) and canary rockfish (Sebastes pinniger) from the west coast of Vancouver Island. The specific objective was to collect length frequency samples from all management sub-areas for both years and both species. These samples would serve to examine the variance in length composition over time and space and to provide length composition data for stock assessment.

Catches of canary rockfish were very low and precluded fulfillment of the cruise objectives for this species. An analysis of the variation of silvergray rockfish lengths among samples over time and space will be reported in a subsequent publication. This document summarizes tow locations and sampling methods as well as presenting the information that was collected on reproductive biology and the prevalence of the parasitic copepod, Sarcotaces arcticus.

METHODS

Fishing Locations

The tow locations (Figures 1 and 2; Appendix Tables 1 and 2) were chosen by the two fishing captains. During the first of the 1985 cruises, the captain was asked to fish the traditional grounds in each of the Management Areas off the west coast of Vancouver Island. The second cruise in 1985 and the 1986 cruise repeated the initial locations although captains were permitted to alter precise tow locations depending on signs of fish schools on the sounder. Replicate tows were made when possible following catches of greater than 500 kg of silvergray or canary rockfish.

The captain of the 1986 cruise offered to identify four additional (less well known) fishing localities provided the coordinates and depths remained confidential. General locations of these tows (8, 9, 12-17, 20-24) are indicated by the shaded areas in Figure 2. Upon the captains' recommendations, the cruises were extended to Management Area 27 in the north and Area 24 to the south.

Trawl Nets

All tows were conducted with bottom-trawl nets. An Atlantic Western II net (Fig. 3) was used for all tows in 1985. An Atlantic Western II net was also used for tows 1-11 and 15-32 in 1986 (Fig. 4), with a Nor'Eastern Trawl being used for tows 12-14 (Fig. 5). Tows were of variable duration.

Sampling of Tows

We collected samples of 300 silvergray or canary rockfish when catches exceeded 500 kg. We attempted to collect the specimens randomly from the entire catch. Length, sex, and maturity information (Appendix Table 3) were recorded from all 300 specimens and otoliths were collected from the first 200.

Beginning with tow 25 of the 1985 cruise, we recorded incidence of Sarcotaces arcticus cysts. This parasite is normally indicated by a cyst which hangs loosely in the abdominal cavity near the anus (Kuitunen-Ekbaum 1949). No attempt was made to conduct a search of the whole fish or to count the number of cysts. Incidence was noted only if a cyst or cysts were observed while examining for maturity and sex of the fish specimen. Small cysts may not have been observed especially if they were located elsewhere in the body. We did not dissect the cysts to verify presence of the parasite.

Catch by species was visually estimated as a proportion of the total catch for major species and directly in pounds for minor constituents. Units were later converted to kilograms.

RESULTS

Catches

Catch rates were low for silvergray rockfish, at 0.24 t/hr and 0.27 t/hr in 1985 and 1986, respectively. They were very low for canary rockfish at 0.07 t/hr and 0.05 t/hr. Targetted commercial fisheries for both species average approximately 0.5 t/hr. The lack of large catches (Appendix Tables 4 and 5) led to a curtailment of sampling design. The especially low catches of the latter species mirrored reduced catches in the commercial fishery for those years.

Samples

Twenty-nine samples of silvergray rockfish and seven samples of canary rockfish were collected over both years (Tables 1-3; Appendix Tables 6-9). Samples from paired tows were obtained on 10 occasions.

Sex ratios and Maturities

The percentage of males in silvergray rockfish samples ranged from 34.8 to 71.9, for an overall precentage of 49.5 (Table 4). For canary rockfish, it ranged from 52.1 to 68.7 with an overall percentage of 59.3. There were no significant trends in sex ratio among areas but the percentage of males appeared lower in 1986 for both species.

Except for immature individuals, silvergray rockfish males were in spent or resting mode (Table 5; Appendix Tables 6-9). The mature females were predominantly ripe, spent, or resting. Between late July and late August in 1985, the ratio of ripe to spent and resting females declined from 0.28 to 0.01. Given the low number of stage 4s (late maturing), it can be assumed that the period of parturition ended during August in 1985. Results in 1986 appeared similar, as late July and early August females produced a ratio of 0.32. A late summer sample however was not obtained in 1986.

Since it is not possible to determine with certainty which of the specimens classified as stage 2 will participate in the approaching reproductive cycle (B. Leaman, pers. comm.), no maturity ogives were derived. To properly derive these ogives, the observations must be collected closer to the midpoint of the cycle when it is obvious which individuals have committed the resources to spawning. There was no observed trend among minor areas in the ratio of ripe to spent and spawning females of silvergray rockfish.

Female adult canary rockfish were predominantly in developing modes (stages 3 and 4), indicating that parturition takes place much earlier in the year than for silvergray rockfish. Males were predominantly in a developing mode. There were too few immature male canary rockfish and too many stage two females to derive maturity ogives for this species. A winter collection would probably be better and should consider stratified sampling by length to insure a sufficient number of immature fish.

Parasite sampling

Sarcotaces arcticus was not present in canary rockfish but was found in 2.54% of the silvergray rockfish (Table 6). Prevalence in silvergray rockfish was equal between sexes and declined dramatically with increasing length (Table 7). Of 35 observed specimens less than 41 cm, seven were parasitized for a prevalence of 20%. The value then declined to 10.0% for 41-45 cm specimens (N=366), to 3.0% for the 46-50 cm group (N=1680), to 1.5% for the 51-55 cm group (N=1893), and finally to 0.2% (N=944) for fish larger than 55 cm.

Prevalence among individual samples ranged from 2.0 to 6.4% in 1985 and 0.0 to 4.1% in 1986. Prevalence was much lower in 1986 than 1985 for all size classes except <41 cm for which there were very few observations (Table 8). None of the specimens were infected in four of the 14 samples in 1986. Fish from area 27 showed a lower prevalence but there was considerable variation among samples and among minor areas (Table 9).

Table 10 shows the percentage and number of fish which appear to have been reproductively mature in the most recent reproductive cycle (stages 4-7). The observations are divided among size classes and between parasitized and non-parasitized groups. Within each size group, it appears that a lower percentage of parasitized fish have recently spawned or will have spawned by the conclusion of the current reproductive cycle. The differences are not statistically different in chi-square tests but the lack of significance mainly results from the small samples of parasitized fish.

DISCUSSION

Length Samples

The charters were successful in identifying the end of the period of parturition for silvergray rockfish. It appeared to conclude during August and can be assumed to have peaked in July. Westrheim (1975) reported that the principal month of parturition takes place after June for B.C. stocks of silvergray rockfish. Parturition for this stock might therefore be assumed to be concentrated in July and August. Adult canary rockfish were mostly in the developing stages. This is congruent with the observation of Westrheim (1975) that parturition occurs before February for this species in B.C. waters. To determine maturity ogives, field collections should be made between January and May for silvergray rockfish and in November or December for canary rockfish.

The presence of Sarcotaces arcticus in silvergray rockfish was noted earlier by Sekerak and Arai (1977). They found one infected specimen in a sample of 10 from the "northeast Pacific ocean". Moser et al. (1985) examined 90 specimens of silvergray rockfish collected off southeast Alaska without finding any infected specimens. The absence of the parasite from canary rockfish concurs with the observations of Sekerak and Arai (1977), who failed to find the parasite in 10 specimens. Moser et al. (1985) suggest that the relative prevalence of the parasite among rockfish species may be indicative of the differing rockfish life histories. In particular they suggest that longer residence time in shallow water as juveniles would lead to higher prevalence. However, little is known about the biology of juvenile canary and silvergray rockfish in B.C. waters.

The observation of lower prevalence among larger fish was reported for Sebastes ciliatus captured in southeastern Alaska (Moser et al. 1985). The authors suggest that it may be a result of parasite-induced host mortality or because the parasites are eliminated at early ages (Kabata 1970). The authors found no differences in the length/weight ratio between infected and non-infected animals so considered the latter explanation more appropriate. Body weights were not examined in the present study but the gonad maturity results would indicate that there are significant costs in maintaining the parasites. The diversion of reproductive resources might however be sufficient to offset the metabolic costs of the parasite, thereby resulting in no change in mortality rates.

There was some indication that prevalence might be lower for fish north of Cape Cook (Area 27) but not enough samples were obtained to permit statistical treatment. The low overall incidence (2.5%) and the large inter-annual variation suggest that the parasite would not be useful for stock delineation. However its usefulness should be examined over a broader geographic area. Samples should be stratified by length as larger numbers of smaller fish would provide more statistical contrast.

This preliminary analysis of parasite prevalence and reproductive timing produced no strong indication that there are separate stocks of silvergray rockfish north and south of Cape Cook (Areas 24-26 and 27).

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Table 1. Distribution of silvergray rockfish samples by year and location. Each sample represented by tow number. Replicates identified by colons.

Area	Locality	Year	
		1985	1986
24	Clayoquot	14:15, 31	
25	Nootka	2, 3, 28:29	4, 5:6, 25
	Esperanza	5:6, 25:26	8:9
26	Ououkinsh	9:10, 23	10
27	Kain's I.	17	18, 20, 21
	W. Cape Cook		12:13, 15, 23

Table 2. Distribution of canary rockfish samples by Year and Location. Each sample represented by tow number. Replicates identified by colons.

Area	Locality	Year	
		1985	1986
23	Ucluelet		29
24	Clayoquot	32:33	1
25	Nootka		6
26	Ououkinsh	9:10	

Table 3. Summary of length frequencies for silvergray and canary rockfish, 1985 and 1986 combined.

Length	Silvergray			Canary		
(cm)	M	F	T	M	F	T
32	0	0	0	1	0	1
33	1	0	1	0	0	0
34	0	0	0	0	0	0
35	2	0	2	1	2	3
36	2	0	2	0	0	0
37	2	7	9	2	0	2
38	0	3	3	1	3	4
39	5	7	12	7	3	10
40	8	8	16	19	10	29
41	20	16	36	20	11	31
42	37	16	53	32	20	52
43	47	48	95	39	28	67
44	94	66	160	43	25	68
45	116	98	214	53	27	80
46	181	158	339	69	43	112
47	262	215	477	93	34	127
48	343	251	594	99	36	135
49	307	292	599	99	44	143
50	374	347	721	87	29	116
51	315	348	663	79	47	126
52	304	305	609	61	39	100
53	279	266	545	61	48	109
54	289	243	532	27	65	92
55	245	177	422	14	33	47
56	166	166	332	5	28	33
57	120	159	279	1	24	25
58	77	145	222	0	16	16
59	28	128	156	0	3	3
60	10	96	106	0	2	2
61	3	59	62	0	7	7
62	1	42	43			
63	1	26	27			
64	1	9	10			
65	0	7	7			
66	0	4	4			
Total	3640	3712	7352	913	627	1540

Table 4. Sex ratios (% males) of silvergray and canary rockfish by year and minor area.

	Areas			
Year	24	25	26	27
Silvergray rockfish				
1985	50.6	50.8	51.8	44.9
1986	-	43.9	44.1	52.7
Canary rockfish				
1985	-	61.8	-	62.9
1986	52.0	58.7	57.6	-

Table 5. Rockfish maturities by cruise.

Silvergray rockfish			
Males			
Maturities	July 24-31/85	August 24-29/85	July 25-August 5/86
1	98	5	151
2	1	0	46
3	6	9	2
4	17	36	0
5	0	0	1
6	4	0	0
7	834	958	1146
Total	960	1008	1346
Females			
1	32	2	94
2	115	92	78
3	11	10	41
4	18	1	19
5	154	8	297
6	315	207	1
7	232	731	926
Total	877	1051	1456

Table 5 (cont'd)

Canary rockfish			
Males			
Maturities	July 24-31/85	August 24-29/85	July 25-August 5/86
1	7	2	1
2	0	0	14
3	37	351	281
4	83	8	0
5	0	0	0
6	1	0	0
7	1	7	4
Total	129	368	296
Females			
1	13	0	1
2	24	42	52
3	26	167	89
4	0	0	62
5	0	0	0
6	3	0	0
7	10	18	15
Total	76	227	219

Table 6. Prevalence of Sarcotaces arcticus in silvergray rockfish.

	Male	Female	Total
Parasitized	60	65	125
Non-parasitized	2353	2440	4793
% parasitized	2.49	2.59	2.54

Table 7. Prevalence of Sarcotaces arcticus by 5-cm length class in silvergray rockfish. (n=number parasitized per class; N=total number of specimens per class.)

	Males		Females		Total	
Length (cm)	n/N	%	n/N	%	n/N	%
<41	4/16	25.0	3/19	15.8	7/35	20.0
41-45	20/207	9.7	16/159	10.1	36/366	10.0
46-50	28/912	3.1	24/768	3.1	52/1680	3.0
51-55	8/983	0.8	20/910	2.2	28/1893	1.5
>55	0/295	0.0	2/649	0.3	2/944	0.2

Table 8. Prevalence of Sarcotaces arcticus by 5-cm length class, sex, and year in silvergray rockfish. (n=number parasitized by class; N=total number of specimens per class.)

	Males				Females			
	1985		1986		1985		1986	
Length (cm)	n/N	%	n/N	%	n/N	%	n/N	%
<41	1/5	20.0	3/11	27.3	1/3	33.3	2/16	12.5
41-45	5/31	16.1	15/176	8.5	6/30	20.0	10/129	7.8
46-50	18/293	6.1	10/619	1.6	14/239	5.9	10/529	1.9
51-55	6/332	1.8	2/651	0.3	14/299	4.7	6/611	1.0
>55	0/80	0.0	0/215	0.0	1/152	0.7	1/497	0.2
Total	30/741	4.0	30/1672	1.8	36/723	5.0	29/1782	1.6

Table 9. Prevalence of Sarcotaces arcticus by 5-cm length interval, sex and minor area in silvergray rockfish. (n=number parasitized by class; N=total number of specimens per class.)

	Minor Area							
	24		25		26		27	
Length (cm)	n/N	%	n/N	%	n/N	%	n/N	%
Males								
<41	0/0	-	2/7	28.6	1/3	33.3	1/6	16.7
41-45	1/5	20.0	7/90	7.8	2/19	10.5	10/93	10.8
46-50	3/56	5.4	19/437	4.4	1/58	1.7	5/361	1.4
51-55	3/65	4.6	3/515	0.6	0/31	0.0	2/372	0.5
>55	0/15	0.0	0/162	0.0	0/19	0.0	0/99	0.0
Total	7/141	5.0	31/1211	2.6	4/130	3.1	18/931	1.9
Females								
<41	0/1	0.0	1/8	12.5	2/5	40.0	0/15	0.0
41-45	2/7	28.6	8/86	9.3	3/11	27.3	3/55	5.5
46-50	4/54	7.4	12/412	2.9	2/66	3.0	6/236	2.5
51-55	1/38	2.6	15/561	2.7	0/54	0.0	4/257	1.6
>55	0/22	0.0	1/314	0.3	1/29	3.4	0/284	0.0
Total	7/122	5.7	37/1381	2.7	8/165	4.8	13/847	1.5

Table 10. Percent spawning (stages 4-7) by 5-cm length class, parasitized versus non-parasitized for silvergray rockfish. (n=number spawning per class; N=total number per class.)

Males

	Parasitized		Non-parasitized	
Length (cm)	%	n/N	%	n/N
<41	0.0	0/4	50.0	6/12
41-45	25.0	5/20	38.0	71/187
46-50	75.0	21/28	91.1	805/884
51-55	87.5	7/8	99.6	971/975
>55	-	0	100.0	295/295

Females

	Parasitized		Non-parasitized	
Length (cm)	%	n/N	%	n/N
<41	0.0	0/3	25.0	4/16
41-45	12.5	2/16	28.0	40/143
46-50	70.8	17/24	80.1	596/744
51-55	90.0	18/20	98.4	876/890
>55	100.0	2/2	99.7	644/646

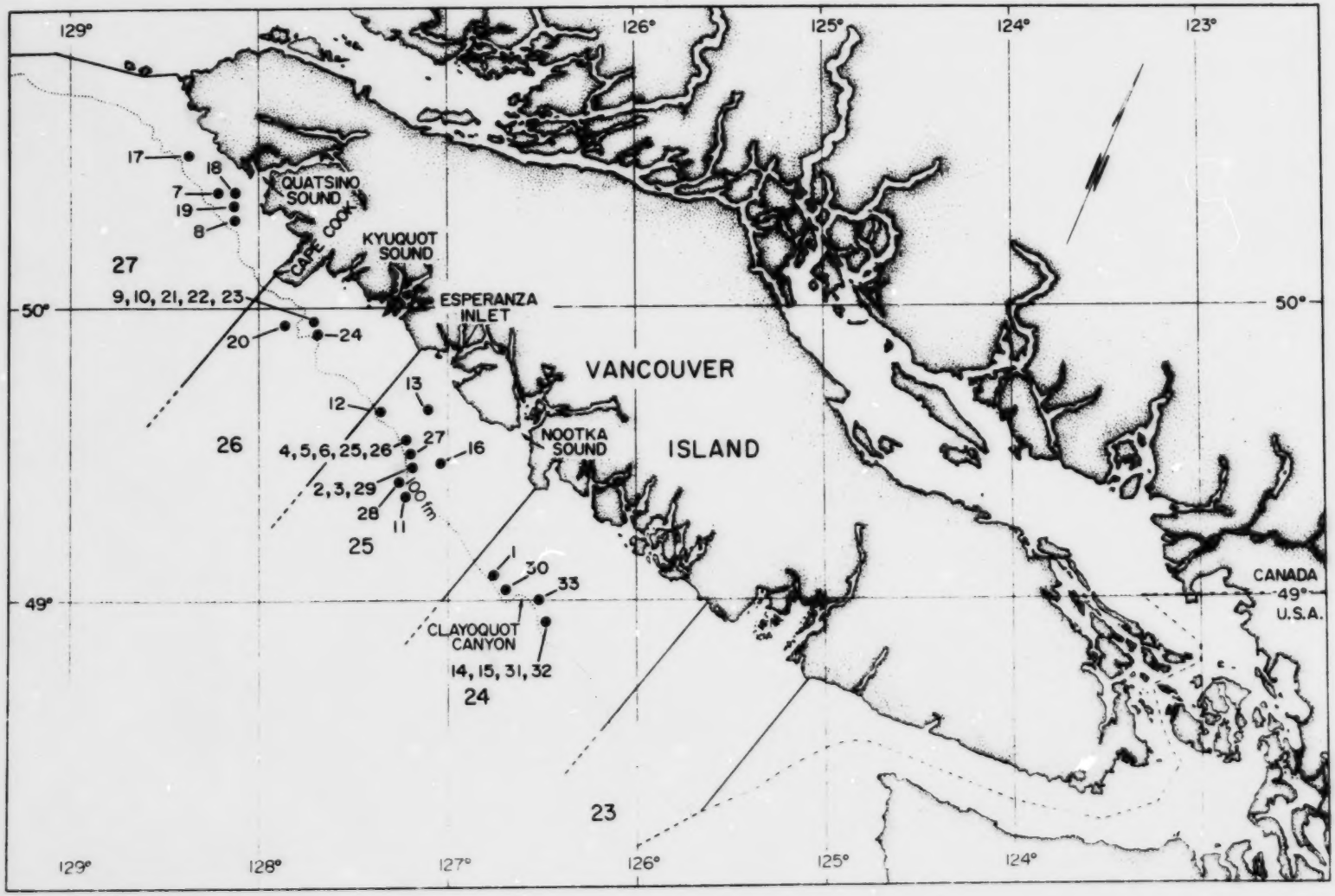


Fig. 1. Numbered tow locations aboard the F/V HOWE BAY, July 24-31, August 24-29, 1985.

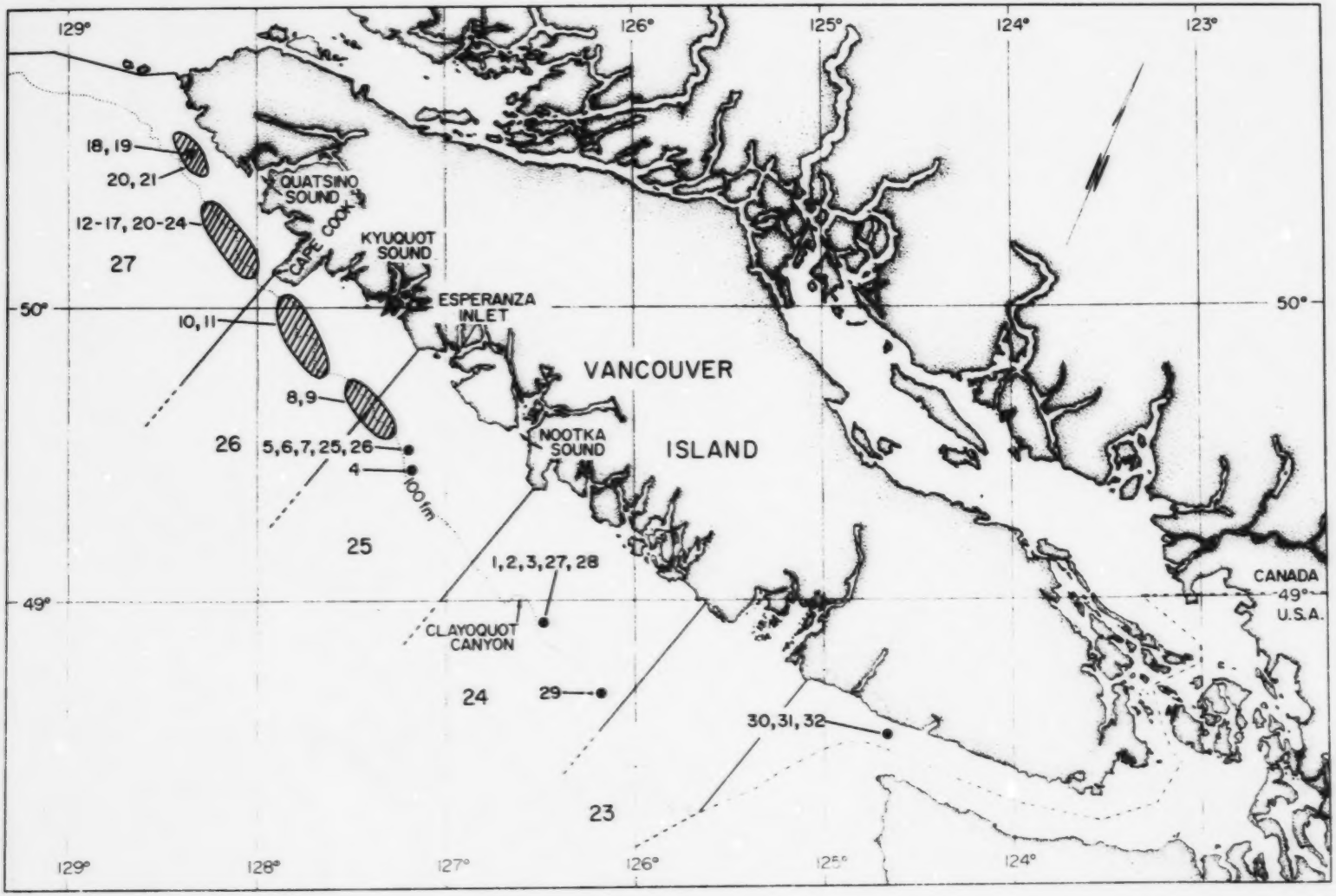


Fig. 2. Numbered tow locations aboard the F/V ARCTIC OCEAN July 28-August 5, 1986. (Shaded areas indicate general location of confidential tows.)

Fig. 3. NET DIMENSIONS AND CHARACTERISTICS FOR BOTTOM TRAWL

VESSEL M/V Howe Bay NET Atlantic Western II A

OBSERVATION PERIOD July 24-31 and August 24-29, 1985

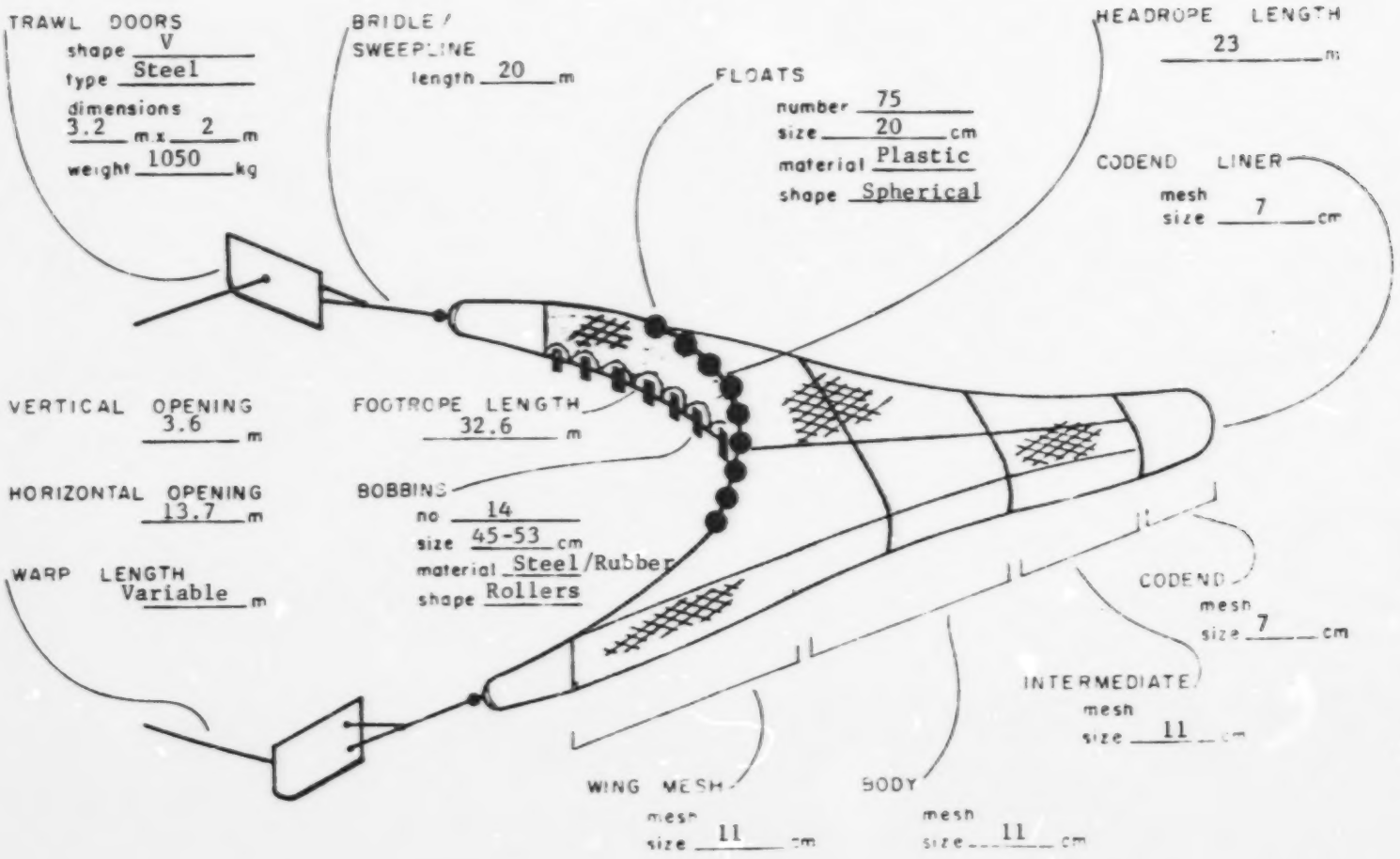


Fig. 4. NET DIMENSIONS AND CHARACTERISTICS FOR BOTTOM TRAWL

VESSEL M/V ARCTIC OCEAN NET Western II Box Trawl

OBSERVATION PERIOD July 27-August 5, 1986 (Tows 1-11, 15-32).

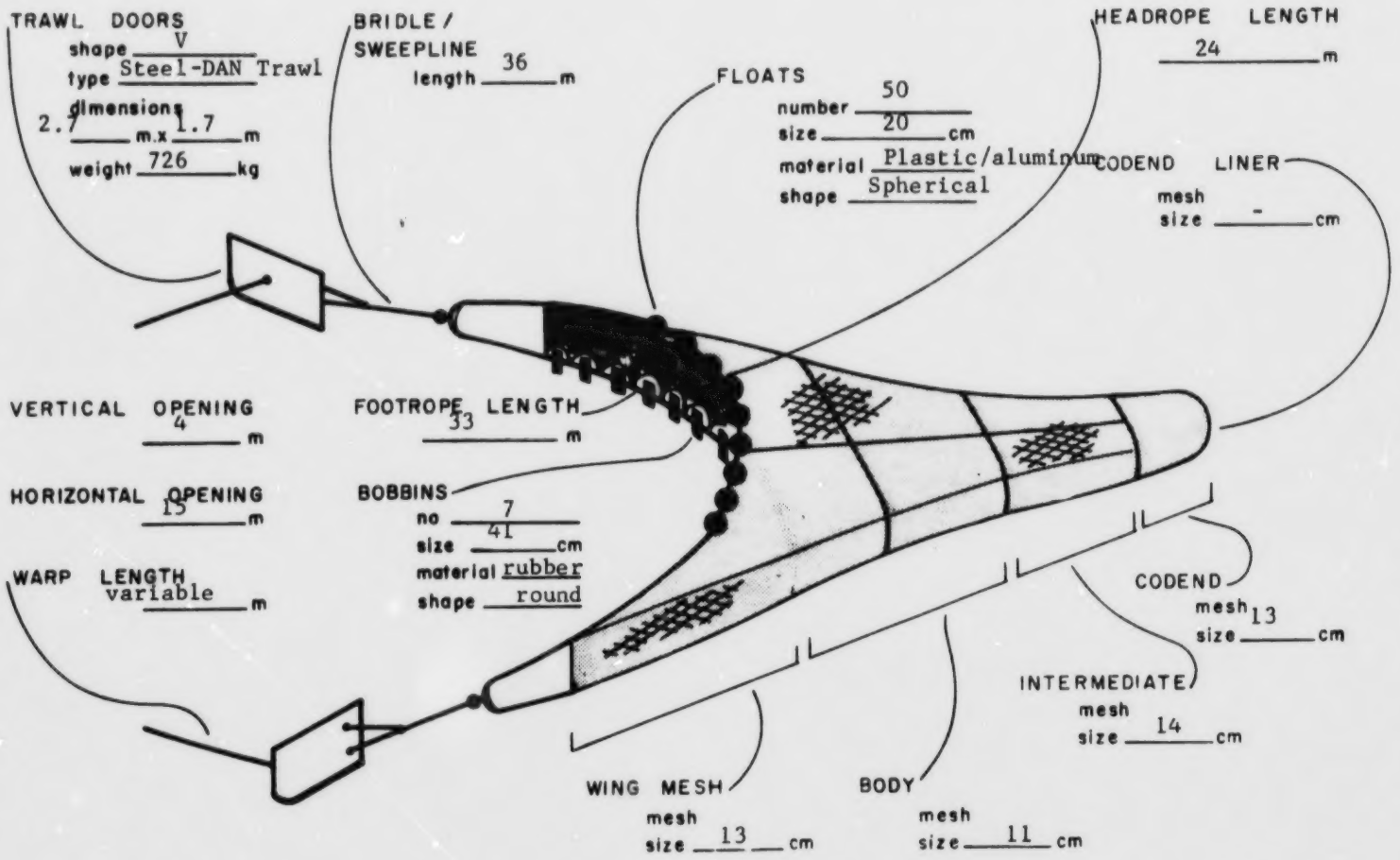
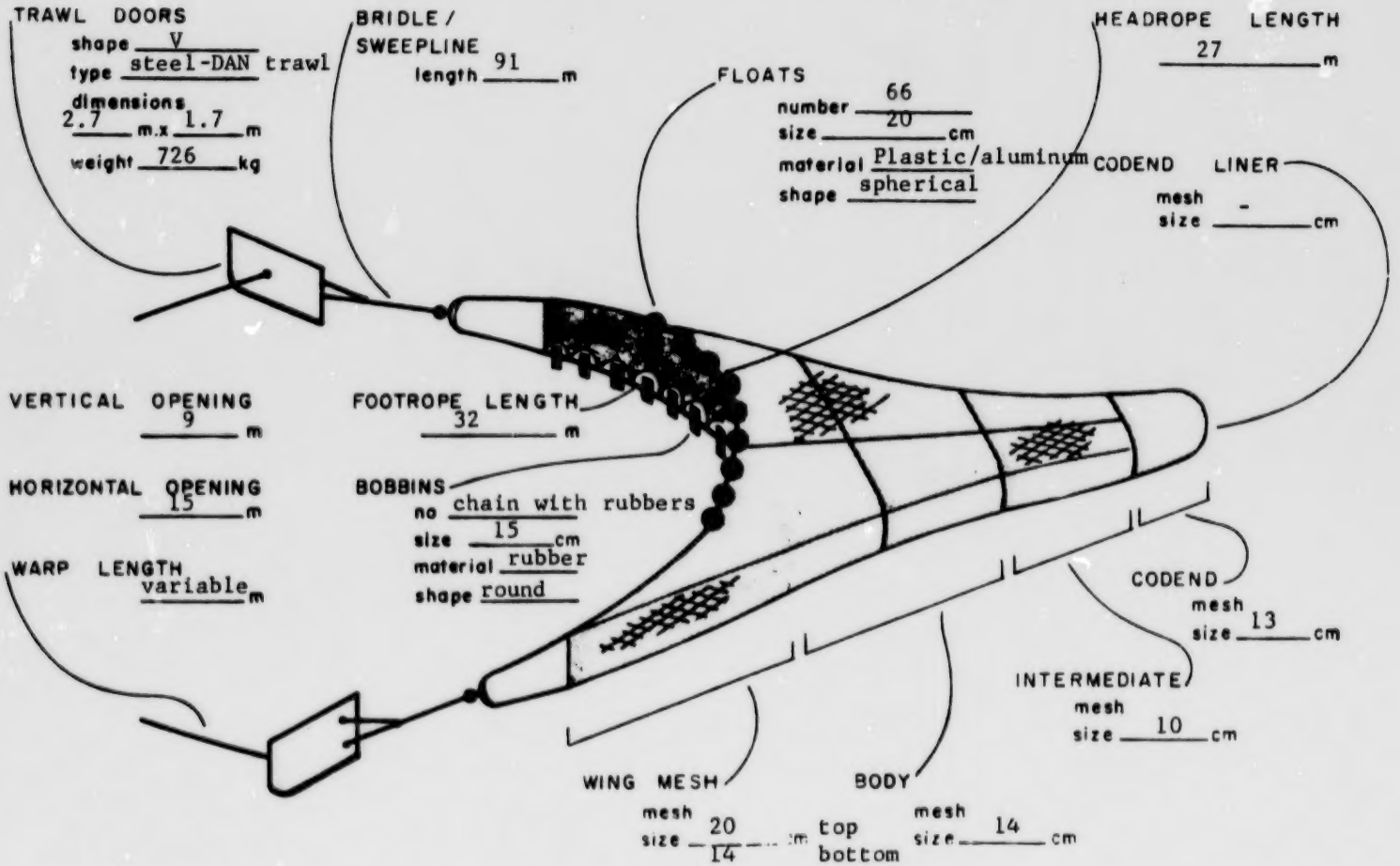


Fig. 5. NET DIMENSIONS AND CHARACTERISTICS FOR BOTTOM TRAWL

VESSEL m/v ARCTIC OCEAN NET Nor'Eastern 3-Bridle Trawl

OBSERVATION PERIOD July 27-August 5 (Tows 12-14)



APPENDIX TABLE 1 SHELF ROCKFISH SURVEY TO AREA 3D IN 1985. TOWS ABOARD THE F/V HOWE BAY JULY 24 - 31, AUGUST 24 - 29.

HAUL NUMBER		1	2	3	4
DATE		JUL 24	JUL 25	JUL 25	JUL 25
AREA (MAJOR, MINOR)		3D,25	3D,25	3D,25	3D,25
START TIME	(PST)	9:10	5:35	8:00	12:30
DURATION	(MIN)	90	90	140	105
START N. LAT.	(DEG)	49	49	49	49
	(MIN)	2.8	30.0	23.8	35.4
W. LONG	(DEG)	126	127	127	127
	(MIN)	45.0	13.0	13.2	16.7
FINISH N. LAT.	(DEG)	49	49	49	49
	(MIN)	5.3	25.2	29.3	29.4
W. LONG	(DEG)	126	127	127	127
	(MIN)	49.0	12.1	14.1	13.1
DIRECTION (DEG.TRUE)		135	350	350	335
BOTTOM DEPTH	(M)	192-201	165-183	170-183	161-168
	(FM)	105-110	90-100	93-100	88- 92
MODAL DEPTH	(M)	197	174	177	165
GEAR TYPE		BT	BT	BT	BT
TIDE		SLACK	EBB	EBB	FLOOD
TOTAL CATCH	(KG)	580	1980	2555	1840
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER	1	2	3	4
DATE	JUL 24	JUL 25	JUL 25	JUL 25
AREA (MAJOR, MINOR)	3D,25	3D,25	3D,25	3D,25
ARROWTOOTH FLOUNDER	..	20	230	70
DOVER SOLE	..	20	..	..
ENGLISH SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	10	..	40	..
OTHER FLATFISH	..	..	..	..
S. alutus	..	..	..	..
S. babcocki	20	..	..	..
S. borealis	..	..	..	..
S. brevispinis	..	540	1360	230
S. diploproa	90	..	..	..
S. elongatus	..	..	..	..
S. flavidus	..	..	..	820
S. paucispinis	..	..	450	40
S. pinniger	..	20	180	..
S. proriger	360	1360	230	640
S. reedi	..	..	..	..
S. ruberrimus	..	..	..	..
S. zacentrus	40	..	..	..
Seb alascanus	20	..	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	10	..	..	20
PACIFIC COD	..	..	5	..
PACIFIC HAKE	..	..	..	..
SABLEFISH	30	20	20	20
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	40	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	..	..
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	580	1980	2555	1840

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER		5	6	7	8
DATE		JUL 26	JUL 26	JUL 27	JUL 27
AREA (MAJOR, MINOR)		3D,25	3D,25	3D,27	3D,27
START TIME	(PST)	5:45	8:30	8:20	10:55
DURATION	(MIN)	105	90	15	45
START N. LAT.	(DEG)	49	49	50	50
	(MIN)	30.7	34.6	23.8	19.7
W. LONG	(DEG)	127	127	128	128
	(MIN)	12.5	15.8	12.2	8.6
FINISH N. LAT.	(DEG)	49	49	50	50
	(MIN)	34.4	30.1	23.3	17.5
W. LONG	(DEG)	127	127	128	128
	(MIN)	15.9	13.9	12.1	7.4
DIRECTION (DEG.TRUE)		335	155	150	155
BOTTOM DEPTH	(M)	161-174	161-174	137-148	137-146
	(FM)	88- 95	88- 95	75- 81	75- 80
MODAL DEPTH	(M)	167	167	143	142
GEAR TYPE		BT	BT	BT	BT
TIDE		SLACK	EBB	EBB	EBB
TOTAL CATCH	(KG)	1175	1400	120	570
REMARKS		USABLE	USABLE	TORN-USE	USABLE

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER	5	6	7	8
DATE	JUL 26	JUL 26	JUL 27	JUL 27
AREA (MAJOR, MINOR)	3D,25	3D,25	3D,27	3D,27
ARROWTOOTH FLOUNDER	90	90	10	180
DOVER SOLE	..	30	10	10
ENGLISH SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	..	..
OTHER FLATFISH	..	..	..	..
S. alutus	40	..	..	..
S. babcocki	..	..	..	..
S. borealis	..	..	..	..
S. brevispinis	340	1130	5	20
S. diploproa	..	..	..	..
S. elongatus	..	..	..	..
S. flavidus	340	..	..	..
S. paucispinis	40	..	..	..
S. pinniger	40	..	..	..
S. proriger	140	110	70	180
S. reedi	..	..	..	..
S. ruberrimus	..	..	20	..
S. zacentrus	..	10	..	..
Seb. alascanus	..	..	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	5	30	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	..	..	..	..
SABLEFISH	140	..	..	180
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	5	..
SPINY DOGFISH	..	..	..	..
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	1175	1400	120	570

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER	9	10	11	12
DATE	JUL 28	JUL 28	JUL 29	JUL 29
AREA (MAJOR, MINOR)	3D,26	3D,26	3D,25	3D,25
START TIME (PST)	8:35	12:15	5:45	12:30
DURATION (MIN)	115	120	90	45
START N. LAT. (DEG)	49	49	49	49
(MIN)	58.4	58.0	25.1	39.6
W. LONG (DEG)	127	127	127	127
(MIN)	44.0	44.2	13.9	22.7
FINISH N. LAT. (DEG)	49	49	49	49
(MIN)	53.4	52.8	20.7	37.7
W. LONG (DEG)	127	127	127	127
(MIN)	40.4	39.2	11.9	21.0
DIRECTION (DEG.TRUE)	150	150	160	335
BOTTOM DEPTH (M)	143-159	146-159	201-220	165-174
(FM)	78- 87	80- 87	110-120	90- 95
MODAL DEPTH (M)	151	153	210	169
GEAR TYPE	BT	BT	BT	BT
TIDE	EBB	SLACK	FLOOD	EBB
TOTAL CATCH (KG)	2420	2285	435	55
REMARKS	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER	9	10	11	12
DATE	JUL 28	JUL 28	JUL 29	JUL 29
AREA (MAJOR, MINOR)	3D,26	3D,26	3D,25	3D,25
ARROWTOOTH FLOUNDER	90	230	30	5
DOVER SOLE	..	90	40	..
ENGLISH SOLE	20	5	..	..
PACIFIC HALIBUT	..	..	..	20
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	40	..
OTHER FLATFISH	..	..	..	..
S. alutus	..	..	140	..
S. babcocki	..	..	..	..
S. borealis	..	..	..	..
S. brevispinis	1130	450	20	..
S. diploproa	..	..	..	..
S. elongatus	..	..	40	..
S. flavidus	..	..	20	..
S. paucispinis	230	..	30	..
S. pinniger	450	90	..	5
S. proriger	450	1360	40	10
S. reedi	..	..	..	..
S. ruberrimus	..	..	..	10
S. zacentrus	..	..	10	..
Seb. alascanus	..	..	..	..
OTHER ROCKFISH	..	..	5	..
LINGCOD	..	..	..	..
PACIFIC COD	5	10	..	..
PACIFIC HAKE	..	..	..	..
SABLEFISH	40	40	20	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	5	10	..	5
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	2420	2285	435	55

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER		13	14	15	16
DATE		JUL 29	JUL 30	JUL 30	JUL 31
AREA (MAJOR, MINOR)		3D,25	3C,24	3C,24	3D,25
START TIME	(PST)	15:00	5:50	8:50	5:15
DURATION	(MIN)	60	85	30	60
START N. LAT.	(DEG)	49	48	48	49
	(MIN)	39.4	52.9	58.1	23.1
W. LONG	(DEG)	127	126	126	127
	(MIN)	8.2	30.8	30.8	2.8
FINISH N. LAT.	(DEG)	49	48	48	49
	(MIN)	38.0	57.0	54.4	20.0
W. LONG	(DEG)	127	126	126	127
	(MIN)	4.6	30.5	31.1	0.7
DIRECTION (DEG.TRUE)		110	0	180	150
BOTTOM DEPTH	(M)	115-119	168-192	168-192	150-155
	(FM)	63- 65	92-105	92-105	82- 85
MODAL DEPTH	(M)	117	180	180	153
GEAR TYPE		BT	BT	BT	BT
TIDE		FLOOD	FLOOD	SLACK	FLOOD
TOTAL CATCH	(KG)	690	1340	1865	75
REMARKS		USABLE	USABLE	USABLE	UNUSABLE

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER	13	14	15	16
DATE	JUL 29	JUL 30	JUL 30	JUL 31
AREA (MAJOR, MINOR)	3D,25	3C,24	3C,24	3D,25
ARROWTOOTH FLOUNDER	410	..	..	..
DOVER SOLE	..	..	..	20
ENGLISH SOLE	10	..	..	..
PACIFIC HALIBUT	20	..	..	..
PETRALE SOLE	30	..	..	..
REX SOLE	..	..	..	..
OTHER FLATFISH	..	..	..	..
S. alutus	..	40	90	..
S. babcocki	..	..	..	..
S. borealis	..	..	..	..
S. brevispinis	..	500	910	..
S. diploproa	..	..	..	..
S. elongatus	..	..	..	..
S. flavidus	..	..	..	..
S. paucispinis	90	90	..	..
S. pinniger	..	10	90	50
S. proriger	..	640	680	5
S. reedi	..	40	40	..
S. ruberrimus	..	..	..	..
S. zacentrus	..	20	30	..
Seb. alascanus	..	..	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	40	..	20	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	..	..	..	..
SABLEFISH	..	..	5	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	90	..	..	..
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	690	1340	1865	75

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER		17	18	19	20
DATE		AUG 24	AUG 24	AUG 24	AUG 25
AREA (MAJOR, MINOR)		3D,27	3D,27	3D,27	3D,26
START TIME	(PST)	7:20	11:20	15:50	10:00
DURATION	(MIN)	120	..	15	75
START N. LAT.	(DEG)	50	50	50	49
	(MIN)	30.1	22.5	21.2	56.9
W. LONG	(DEG)	128	128	128	127
	(MIN)	22.4	17.4	17.1	55.4
FINISH N. LAT.	(DEG)	50	50	50	49
	(MIN)	30.4	22.5	21.0	56.7
W. LONG	(DEG)	128	128	128	127
	(MIN)	21.9	17.4	16.9	49.1
DIRECTION (DEG.TRUE)		150	0	180	90
BOTTOM DEPTH	(M)	146-165	146-146	187-188	210-265
	(FM)	80- 90	80- 80	102-103	115-145
MODAL DEPTH	(M)	155	146	188	238
GEAR TYPE		BT	BT	BT	BT
TIDE		EBB	SLACK	FLOOD	EBB
TOTAL CATCH	(KG)	2370	0	145	2170
REMARKS		USABLE	UNUSABLE	UNUSABLE	USABLE

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER	17	18	19	20
DATE	AUG 24	AUG 24	AUG 24	AUG 25
AREA (MAJOR, MINOR)	3D,27	3D,27	3D,27	3D,26
ARROWTOOTH FLOUNDER	20	..	..	..
DOVER SOLE	10	..	..	..
ENGLISH SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	..	..
OTHER FLATFISH	..	..	..	..
S. alutus	90	..	5	1810
S. babcocki	40	..	..	..
S. borealis	..	..	..	70
S. brevispinis	680	..	..	..
S. diploproa	..	..	..	..
S. elongatus	..	..	..	..
S. flavidus	..	..	..	..
S. paucispinis	..	..	10	..
S. pinniger	30	..	..	..
S. proriger	1360	..	90	..
S. reedi	..	..	..	..
S. ruberrimus	..	..	..	..
S. zacentrus	..	..	40	230
Seb. alascanus	20	..	..	40
OTHER ROCKFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	10	..	..	..
PACIFIC HAKE	..	..	..	..
SABLEFISH	110	..	..	20
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	..	..
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	2370	0	145	2170

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER		21	22	23	24
DATE		AUG 25	AUG 25	AUG 26	AUG 26
AREA (MAJOR, MINOR)		3D,26	3D,26	3D,26	3D,26
START TIME	(PST)	13:00	16:30	6:15	10:00
DURATION	(MIN)	105	90	120	120
START N. LAT.	(DEG)	49	49	49	49
	(MIN)	58.5	58.8	59.8	57.6
W. LONG	(DEG)	127	127	127	127
	(MIN)	44.1	43.8	44.0	42.5
FINISH N. LAT.	(DEG)	49	49	49	49
	(MIN)	54.1	55.6	53.4	51.8
W. LONG	(DEG)	127	127	127	127
	(MIN)	42.4	41.2	40.2	39.0
DIRECTION (DEG.TRUE)		150	150	150	150
BOTTOM DEPTH	(M)	155-161	119-137	145-155	145-152
	(FM)	85- 88	65- 75	79- 85	79- 83
MODAL DEPTH	(M)	158	128	150	148
GEAR TYPE		BT	BT	BT	BT
TIDE		FLOOD	FLOOD	FLOOD	EBB
TOTAL CATCH	(KG)	225	360	685	200
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER	21	22	23	24
DATE	AUG 25	AUG 25	AUG 26	AUG 26
AREA (MAJOR, MINOR)	3D,26	3D,26	3D,26	3D,26
ARROWTOOTH FLOUNDER	140	270	140	160
DOVER SOLE	40	..	5	..
ENGLISH SOLE	..	40	..	..
PACIFIC HALIBUT	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	..	..
OTHER FLATFISH	..	..	..	..
S. alutus	..	..	..	..
S. babcocki	..	..	..	..
S. borealis	..	..	..	..
S. brevispinis	10	40	500	40
S. diploproa	..	..	..	..
S. elongatus	..	..	..	..
S. flavidus	..	..	..	..
S. paucispinis	..	5	..	..
S. pinniger	20	..	40	..
S. proriger	..	..	..	..
S. reedi	..	..	..	..
S. ruberrimus	..	5	..	..
S. zacentrus	5	..	..	..
Seb. alascanus	..	..	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	..	..	..	..
SABLEFISH	..	..	..	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	10	..	..	..
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	225	360	685	200

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER		25	26	27	28
DATE		AUG 27	AUG 27	AUG 27	AUG 28
AREA (MAJOR, MINOR)		3D,25	3D,25	3D,25	3D,25
START TIME	(PST)	6:45	10:15	13:00	6:10
DURATION	(MIN)	55	120	120	90
START N. LAT.	(DEG)	49	49	49	49
	(MIN)	33.7	34.9	28.8	24.9
W. LONG	(DEG)	127	127	127	127
	(MIN)	15.2	15.5	13.6	12.8
FINISH N. LAT.	(DEG)	49	49	49	49
	(MIN)	30.6	27.7	22.9	30.0
W. LONG	(DEG)	127	127	127	127
	(MIN)	14.0	14.3	12.8	13.1
DIRECTION (DEG.TRUE)		155	155	350	350
BOTTOM DEPTH	(M)	174-183	174-183	174-201	174-183
	(FM)	95-100	95-100	95-110	95-100
MODAL DEPTH	(M)	178	178	188	178
GEAR TYPE		BT	BT	BT	BT
TIDE		FLOOD	EBB	SLACK	FLOOD
TOTAL CATCH	(KG)	910	750	1365	1780
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER	25	26	27	28
DATE	AUG 27	AUG 27	AUG 27	AUG 28
AREA (MAJOR, MINOR)	3D,25	3D,25	3D,25	3D,25
ARROWTOOTH FLOUNDER	40	40	40	90
DOVER SOLE	..	10	..	..
ENGLISH SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	..	..
OTHER FLATFISH	..	..	..	..
S. alutus	10	20	910	910
S. babcocki	..	..	..	..
S. borealis	..	..	..	..
S. brevispinis	680	500	180	570
S. diploproa	..	..	..	..
S. elongatus	..	..	..	..
S. flavidus	..	..	..	..
S. paucispinis	20	110	..	40
S. pinniger	20	40	..	..
S. proriger	70	..	110	20
S. reedi	..	..	..	..
S. ruberrimus	..	..	..	..
S. zacentrus	..	..	30	110
Seb. alascanus	..	..	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	5	..
PACIFIC HAKE	..	..	..	..
SABLEFISH	70	20	90	40
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	10	..	..
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	910	750	1365	1780

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER		29	30	31	32
DATE		AUG 28	AUG 28	AUG 29	AUG 29
AREA (MAJOR, MINOR)		3D,25	3D,25	3C,24	3C,24
START TIME	(PST)	8:15	14:00	6:10	8:30
DURATION	(MIN)	90	120	110	120
START N. LAT.	(DEG)	49	49	48	48
	(MIN)	29.8	4.7	53.2	59.2
W. LONG	(DEG)	127	126	126	127
	(MIN)	13.4	48.9	31.2	32.4
FINISH N. LAT.	(DEG)	49	49	48	48
	(MIN)	25.2	1.4	58.3	56.8
W. LONG	(DEG)	127	126	126	127
	(MIN)	12.3	38.8	32.4	29.9
DIRECTION (DEG.TRUE)		170	140	0	150
BOTTOM DEPTH	(M)	161-174	161-201	174-192	161-168
	(FM)	88- 95	88-110	95-105	88- 92
MODAL DEPTH	(M)	166	181	183	165
GEAR TYPE		BT	BT	BT	BT
TIDE		SLACK	SLACK	FLOOD	SLACK
TOTAL CATCH	(KG)	1080	2575	1740	1500
REMARKS		USABLE	USABLE	USABLE	SNAG-USE

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER	29	30	31	32
DATE	AUG 28	AUG 28	AUG 29	AUG 29
AREA (MAJOR, MINOR)	3D,25	3D,25	3C,24	3C,24
ARROWTOOTH FLOUNDER	..	90	20	20
DOVER SOLE	..	10	..	..
ENGLISH SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	..	..
OTHER FLATFISH	..	..	..	..
S. alutus	450	230	40	..
S. babcocki	..	..	10	..
S. borealis	..	..	..	..
S. brevispinis	500	270	450	180
S. diploproa	..	..	..	..
S. elongatus	..	..	..	..
S. flavidus	..	..	..	..
S. paucispinis	20	..	140	..
S. pinniger	..	..	..	1130
S. proriger	70	1810	450	40
S. reedi	..	..	450	..
S. ruberrimus	..	..	..	..
S. zacentrus	30	90	140	20
Seb. alascanus	10	20	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	..	5	..	..
SABLEFISH	..	40	40	110
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	10	..	..
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	1080	2575	1740	1500

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER		33
DATE		AUG 29
AREA (MAJOR, MINOR)		3C,23
START TIME	(PST)	11:15
DURATION	(MIN)	75
START N. LAT.	(DEG)	48
	(MIN)	56.8
W. LONG	(DEG)	126
	(MIN)	28.1
FINISH N. LAT.	(DEG)	49
	(MIN)	0.2
W. LONG	(DEG)	126
	(MIN)	30.7
DIRECTION (DEG.TRUE)		0
BOTTOM DEPTH	(M)	163-166
	(FM)	89- 91
MODAL DEPTH	(M)	165
GEAR TYPE		BT
TIDE		EBB
TOTAL CATCH	(KG)	1130
REMARKS		USABLE

APPENDIX TABLE 1 (CONTINUED)

HAUL NUMBER	33
DATE	AUG 29
AREA (MAJOR, MINOR)	3C,23
ARROWTOOTH FLOUNDER	90
DOVER SOLE	..
ENGLISH SOLE	..
PACIFIC HALIBUT	20
PETRALE SOLE	..
REX SOLE	..
OTHER FLATFISH	..
S. alutus	..
S. babcocki	..
S. borealis	..
S. brevispinis	20
S. diploproa	..
S. elongatus	..
S. flavidus	..
S. paucispinis	..
S. pinniger	910
S. proriger	..
S. reedi	..
S. ruberrimus	..
S. zacentrus	..
Seb. alascanus	..
OTHER ROCKFISH	..
LINGCOD	..
PACIFIC COD	..
PACIFIC HAKE	..
SABLEFISH	90
OTHER ROUNDFISH	..
RATFISH	..
SKATES	..
SPINY DOGFISH	..
OTHER SELACHII	..
TOTAL CATCH (KG)	1130

APPENDIX TABLE 2. SHELF ROCKFISH SURVEY TO AREA 3D IN 1986 SHELF ROCKFISH TOWS ABOARD THE F/V ARCTIC OCEAN JULY 28 - AUGUST 5, 1986. ('*' - confidential information).

HAUL NUMBER		1	2	3	4
DATE		JUL 28	JUL 28	JUL 28	JUL 28
AREA (MAJOR, MINOR)		3C,24	3C,24	3C,24	3D,25
START TIME	(PST)	9:00	10:30	12:24	19:07
DURATION	(MIN)	60	90	60	125
START N. LAT.	(DEG)	48	48	48	49
	(MIN)	54.3	56.0	54.4	24.1
W. LONG	(DEG)	126	126	126	127
	(MIN)	28.7	30.5	28.9	11.7
FINISH N. LAT.	(DEG)	48	48	48	49
	(MIN)	56.6	53.5	57.2	29.5
W. LONG	(DEG)	126	126	126	127
	(MIN)	30.1	30.3	28.9	13.4
DIRECTION (DEG.TRUE)		315	135	350	315
BOTTOM DEPTH	(M)	163-170	170-174	161-168	172-183
	(FM)	89- 93	93- 95	88- 92	94-100
MODAL DEPTH	(M)	167	172	165	178
GEAR TYPE		BT	BT	BT	BT
TIDE		..	..	..	..
TOTAL CATCH	(KG)	454	544	227	1134
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER	1	2	3	4
DATE	JUL 28	JUL 28	JUL 28	JUL 28
AREA (MAJOR, MINOR)	3C,24	3C,24	3C,24	3D,25
ARROWTOOTH FLOUNDER	14	31	35	86
DOVER SOLE	4	..	7	17
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	..	..	11	..
PETRALE SOLE	..	4	2	..
REX SOLE	..	..	..	17
OTHER FLATFISH	..	..	..	..
S. alutus	..	..	..	..
S. babcocki	..	1	..	..
S. brevispinis	3	12	..	427
S. elongatus	..	3	4	9
S. entomelas	..	..	..	43
S. flavidus	1	250	71	257
S. paucispinis	..	..	21	..
S. pinniger	291	43	53	43
S. proriger	2	186	..	171
S. reedi	..	1	..	..
S. ruberrimus	..	..	..	..
S. zacentrus	..	..	..	..
Seb. alascanus	..	3	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	127	..	..	..
PACIFIC COD	5	..	..	..
PACIFIC HAKE	..	1	14	..
SABLEFISH	7	9	9	43
SALMON TROUT	..	..	..	..
WALLEYE POLLOCK	..	..	..	..
WOLF EEL	..	..	..	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	..	21
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	454	544	227	1134

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER		5	6	7	8
DATE		JUL 29	JUL 29	JUL 29	JUL 29
AREA (MAJOR, MINOR)		3D,25	3D,25	3D,25	3D,25
START TIME	(PST)	6:10	8:14	10:58	15:45
DURATION	(MIN)	128	121	68	*
START N. LAT.	(DEG)	49	49	49	*
	(MIN)	27.7	33.5	28.5	*
W. LONG	(DEG)	127	127	127	*
	(MIN)	13.1	17.4	13.0	*
FINISH N. LAT.	(DEG)	49	49	49	*
	(MIN)	32.3	31.0	30.5	*
W. LONG	(DEG)	127	127	127	*
	(MIN)	15.4	12.0	16.5	*
DIRECTION (DEG.TRUE)		345	145	300	*
BOTTOM DEPTH	(M)	165-174	164-168	165-199	*
	(FM)	90- 95	90- 92	90-109	*
MODAL DEPTH	(M)	170	166	182	*
GEAR TYPE		BT	BT	BT	BT
TIDE		..	..	..	..
TOTAL CATCH	(KG)	680	1361	1361	2268
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER	5	6	7	8
DATE	JUL 29	JUL 29	JUL 29	JUL 29
AREA (MAJOR, MINOR)	3D,25	3D,25	3D,25	3D,25
ARROWTOOTH FLOUNDER	120	49	40	49
DOVER SOLE	38	7	5	10
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	..	20	50	7
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	10	5
OTHER FLATFISH	..	..	..	..
S. alutus	..	..	..	121
S. babcocki	2	2	2	146
S. brevispinis	383	879	644	1504
S. elongatus	1	..	..	..
S. entomelas	..	..	..	24
S. flavidus	1	146	25	15
S. paucispinis	..	..	..	291
S. pinniger	108	146	372	24
S. proriger	22	29	99	24
S. reedi	..	..	..	..
S. ruberrimus	..	..	..	..
S. zacentrus	5	..	..	19
Seb. alascanus	..	..	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	..	59	99	24
PACIFIC COD	..	..	..	..
PACIFIC HAKE	..	..	..	..
SABLEFISH	..	..	5	..
SALMON TROUT	..	..	..	..
WALLEYE POLLOCK	..	..	..	..
WOLF EEL	..	..	..	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	10	..
SPINY DOGFISH	..	24	..	5
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	680	1361	1361	2268

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER		9	10	11	12
DATE		JUL 29	JUL 30	JUL 30	JUL 30
AREA (MAJOR, MINOR)		3D,25	3D,26	3D,26	3D,27
START TIME	(PST)	18:07	5:10	9:10	15:00
DURATION	(MIN)	53	145	122	68
START N. LAT.	(DEG)	*	49	49	*
	(MIN)	*	54.4	51.8	*
W. LONG	(DEG)	*	127	127	*
	(MIN)	*	44.3	39.5	*
FINISH N. LAT.	(DEG)	*	49	49	*
	(MIN)	*	49.8	56.8	*
W. LONG	(DEG)	*	127	127	*
	(MIN)	*	38.9	45.0	*
DIRECTION (DEG.TRUE)		*	135	330	*
BOTTOM DEPTH	(M)	*	165-172	146-154	*
	(FM)	*	90- 94	80- 84	*
MODAL DEPTH	(M)	*	169	150	*
GEAR TYPE		BT	BT	BT	BT
TIDE		..	..	..	..
TOTAL CATCH	(KG)	1814	2268	181	1452
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER	9	10	11	12
DATE	JUL 29	JUL 30	JUL 30	JUL 30
AREA (MAJOR, MINOR)	3D,25	3D,26	3D,26	3D,27
ARROWTOOTH FLOUNDER	94	..	47	27
DOVER SOLE	..	..	..	44
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	57	..	6	22
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	..	11
OTHER FLATFISH	..	..	..	..
S. alutus	118	..	..	..
S. babcocki	47	..	..	204
S. brevispinis	802	834	35	858
S. elongatus	9	..	..	..
S. entomelas	..	..	..	7
S. flavidus	9	..	..	15
S. paucispinis	189	132	38	58
S. pinniger	47	176	24	145
S. proriger	330	1054	..	..
S. reedi	..	..	..	..
S. ruberrimus	..	..	..	..
S. zacentrus	71	44	..	..
Seb. alascanus	..	..	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	24	26	28	..
PACIFIC COD	2	2	2	7
PACIFIC HAKE	..	..	..	..
SABLEFISH	5	..	..	36
SALMON TROUT	..	..	..	1
WALLEYE POLLOCK	..	..	..	..
WOLF EEL	..	..	1	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	2
SKATES	5	..	..	2
SPINY DOGFISH	5	..	..	13
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	1814	2268	181	1452

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER		13	14	15	16
DATE		JUL 30	JUL 30	JUL 31	JUL 31
AREA (MAJOR, MINOR)		3D,27	3D,27	3D,27	3D,27
START TIME	(PST)	17:06	19:35	6:10	8:00
DURATION	(MIN)	90	115	65	120
START N. LAT.	(DEG)	*	50	50	*
	(MIN)	*	8.4	10.5	*
W. LONG	(DEG)	*	128	128	*
	(MIN)	*	2.3	6.1	*
FINISH N. LAT.	(DEG)	*	50	50	*
	(MIN)	*	6.4	13.3	*
W. LONG	(DEG)	*	128	128	*
	(MIN)	*	1.0	6.8	*
DIRECTION (DEG.TRUE)		*	105	300	*
BOTTOM DEPTH	(M)	*	128-135	168-172	*
	(FM)	*	70- 74	92- 94	*
MODAL DEPTH	(M)	*	132	170	*
GEAR TYPE		BT	BT	BT	BT
TIDE		..	..	..	..
TOTAL CATCH	(KG)	1089	723	1089	1089
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER	13	14	15	16
DATE	JUL 30	JUL 30	JUL 31	JUL 31
AREA (MAJOR, MINOR)	3D,27	3D,27	3D,27	3D,27
ARROWTOOTH FLOUNDER	22	140	48	631
DOVER SOLE	35	71	23	253
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	35	56	8	17
PETRALE SOLE	1	..	..	11
REX SOLE	9	..	12	..
OTHER FLATFISH	..	..	..	..
S. alutus	..	..	..	..
S. babcocki	349	..	154	..
S. brevispinis	455	..	712	34
S. elongatus	..	..	..	..
S. entomelas	..	..	..	..
S. flavidus	17	131	..	..
S. paucispinis	70	..	58	34
S. pinniger	70	262	19	..
S. proriger	..	1	..	..
S. reedi	..	..	..	..
S. ruberrimus	..	..	..	..
S. zacentrus	..	..	..	..
Seb. alascanus	..	9	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	..	15	19	84
PACIFIC COD	4	4	..	25
PACIFIC HAKE	..	..	..	..
SABLEFISH	17	..	2	..
SALMON TROUT	..	..	..	..
WALLEYE POLLOCK	1	4	..	..
WOLF EEL	..	..	..	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	23	5	..
SKATES	4	7	..	..
SPINY DOGFISH	..	..	29	..
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	1089	723	1089	1089

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER		17	18	19	20
DATE		JUL 31	JUL 31	JUL 31	JUL 31
AREA (MAJOR, MINOR)		3D,27	5A,11	5A,11	5A,11
START TIME	(PST)	11:20	14:27	17:05	19:30
DURATION	(MIN)	75	123	100	80
START N. LAT.	(DEG)	*	50	50	*
	(MIN)	*	29.0	33.4	*
W. LONG	(DEG)	*	128	128	*
	(MIN)	*	20.8	25.1	*
FINISH N. LAT.	(DEG)	*	50	50	*
	(MIN)	*	33.3	29.7	*
W. LONG	(DEG)	*	128	128	*
	(MIN)	*	25.7	21.3	*
DIRECTION (DEG.TRUE)		*	290	120	*
BOTTOM DEPTH	(M)	*	157-166	150-157	*
	(FM)	*	86- 91	82- 86	*
MODAL DEPTH	(M)	*	162	154	*
GEAR TYPE		BT	BT	BT	BT
TIDE		..	..	..	..
TOTAL CATCH	(KG)	340	2268	2268	3175
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER	17	18	19	20
DATE	JUL 31	JUL 31	JUL 31	JUL 31
AREA (MAJOR, MINOR)	3D,27	5A,11	5A,11	5A,11
ARROWTOOTH FLOUNDER	13	474	738	1438
DOVER SOLE	13	900	1154	480
ENGLISH SOLE	..	..	..	34
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	..	2	..	60
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	2	24
OTHER FLATFISH	..	..	..	..
S. alutus	..	14	..	..
S. babcocki	..	95	46	..
S. brevispinis	63	474	184	768
S. elongatus	..	9	1	..
S. entomelas	..	..	..	5
S. flavidus	..	..	9	48
S. paucispinis	21	38	23	24
S. pinniger	17	..	..	24
S. proriger	169	142	46	48
S. reedi	..	..	..	..
S. ruberrimus	13	..	..	..
S. zacentrus	2	..	..	..
Seb. alascanus	..	1	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	17	..	..	48
PACIFIC COD	..	..	14	10
PACIFIC HAKE	..	..	1	10
SABLEFISH	4	95	32	144
SALMON TROUT	..	..	..	..
WALLEYE POLLOCK	..	..	9	..
WOLF EEL	..	..	..	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	24	..	..
SPINY DOGFISH	8	..	9	10
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	340	2268	2268	3175

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER		21	22	23	24
DATE		AUG 1	AUG 1	AUG 1	AUG 1
AREA (MAJOR, MINOR)		5A,11	3D,27	3D,27	3D,27
START TIME	(PST)	6:27	13:20	16:14	19:50
DURATION	(MIN)	120	110	78	51
START N. LAT.	(DEG)	*	50	50	*
	(MIN)	*	8.3	10.2	*
W. LONG	(DEG)	*	128	128	*
	(MIN)	*	2.2	5.9	*
FINISH N. LAT.	(DEG)	*	50	50	*
	(MIN)	*	6.4	13.2	*
W. LONG	(DEG)	*	128	128	*
	(MIN)	*	0.9	6.7	*
DIRECTION (DEG.TRUE)		*	90	310	*
BOTTOM DEPTH	(M)	*	128-154	168-172	*
	(FM)	*	70- 84	92- 94	*
MODAL DEPTH	(M)	*	141	170	*
GEAR TYPE		BT	BT	BT	BT
TIDE		..	..	..	..
TOTAL CATCH	(KG)	3946	1814	1361	499
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER	21	22	23	24
DATE	AUG 1	AUG 1	AUG 1	AUG 1
AREA (MAJOR, MINOR)	5A,11	3D,27	3D,27	3D,27
ARROWTOOTH FLOUNDER	2281	836	..	78
DOVER SOLE	..	71	86	31
ENGLISH SOLE	77	27	..	2
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	11	10	..	9
PETRALE SOLE	21	8	..	..
REX SOLE	2	..	..	..
OTHER FLATFISH	..	..	..	..
S. alutus	..	..	..	..
S. babcocki	..	..	..	2
S. brevispinis	1048	..	1183	31
S. elongatus	1	..	..	..
S. entomelas	..	2	..	..
S. flavidus	..	377	..	154
S. paucispinis	191	126	23	47
S. pinniger	..	42	9	93
S. proriger	..	13	..	..
S. reedi	..	..	..	..
S. ruberrimus	..	4	..	6
S. zacentrus	..	..	..	..
Seb. alascanus	..	..	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	91	84	27	31
PACIFIC COD	16	42	5	5
PACIFIC HAKE	..	..	..	..
SABLEFISH	198	147	14	9
SALMON TROUT	..	..	..	..
WALLEYE POLLOCK	..	..	..	1
WOLF EEL	..	..	..	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	9	..
SPINY DOGFISH	9	25	5	..
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	3946	1814	1361	499

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER		25	26	27	28
DATE		AUG 2	AUG 2	AUG 4	AUG 4
AREA (MAJOR, MINOR)		3D,25	3D,25	3C,24	3C,24
START TIME	(PST)	5:48	8:55	8:40	11:28
DURATION	(MIN)	130	120	110	90
START N. LAT.	(DEG)	49	49	48	48
	(MIN)	34.6	29.6	56.6	52.7
W. LONG	(DEG)	127	127	126	126
	(MIN)	16.3	11.6	30.7	31.1
FINISH N. LAT.	(DEG)	49	49	48	48
	(MIN)	28.7	34.1	52.3	56.4
W. LONG	(DEG)	127	127	126	126
	(MIN)	12.1	13.3	28.3	30.8
DIRECTION (DEG.TRUE)		135	315	250	290
BOTTOM DEPTH	(M)	163-168	150-157	168-176	179-219
	(FM)	89- 92	82- 86	92- 96	98-120
MODAL DEPTH	(M)	166	154	172	199
GEAR TYPE		BT	BT	BT	BT
TIDE		..	..	..	..
TOTAL CATCH	(KG)	680	0	408	544
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER	25	26	27	28
DATE	AUG 2	AUG 2	AUG 4	AUG 4
AREA (MAJOR, MINOR)	3D,25	3D,25	3C,24	3C,24
ARROWTOOTH FLOUNDER	4	..	..	..
DOVER SOLE	10	..	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PACIFIC HALIBUT	4	..	8	9
PETRALE SOLE	..	..	..	..
REX SOLE	2	..	..	..
OTHER FLATFISH	..	..	..	..
S. alutus	..	..	..	..
S. babcocki	..	..	45	..
S. brevispinis	494	..	225	297
S. elongatus	..	..	..	..
S. entomelas	2	..	..	..
S. flavidus	19	..	..	..
S. paucispinis	38	..	45	63
S. pinniger	76	..	45	..
S. proriger	..	..	40	93
S. reedi	..	..	..	63
S. ruberrimus	..	..	..	..
S. zacentrus	..	..	..	..
Seb. alascanus	..	..	..	2
OTHER ROCKFISH	..	..	..	..
LINGCOD	23	..	..	17
PACIFIC COD	..	..	..	..
PACIFIC HAKE	..	..	..	..
SABLEFISH	8	..	..	..
SALMON TROUT	..	..	..	..
WALLEYE POLLOCK	..	..	..	..
WOLF EEL	..	..	..	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	..	..
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	680	0	408	544

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER		29	30	31	32
DATE		AUG 4	AUG 5	AUG 5	AUG 5
AREA (MAJOR, MINOR)		3C,23	4B,20	4B,20	4B,20
START TIME	(PST)	15:55	4:45	8:15	10:35
DURATION	(MIN)	125	170	100	40
START N. LAT.	(DEG)	48	48	48	48
	(MIN)	44.2	33.2	31.0	32.7
W. LONG	(DEG)	126	124	124	124
	(MIN)	15.0	40.1	34.5	38.0
FINISH N. LAT.	(DEG)	48	48	48	48
	(MIN)	38.4	31.7	31.9	32.5
W. LONG	(DEG)	126	124	124	124
	(MIN)	11.3	34.5	41.4	35.3
DIRECTION (DEG.TRUE)		155	90	260	0
BOTTOM DEPTH	(M)	176-190	110-117	157-166	69- 88
	(FM)	96-104	60- 64	86- 91	38- 48
MODAL DEPTH	(M)	183	114	162	79
GEAR TYPE		BT	BT	BT	BT
TIDE		..	..	..	..
TOTAL CATCH	(KG)	2268	1814	1361	1814
REMARKS		USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 2 (CONTINUED)

HAUL NUMBER	29	30	31	32
DATE	AUG 4	AUG 5	AUG 5	AUG 5
AREA (MAJOR, MINOR)	3C,23	4B,20	4B,20	4B,20
ARROWTOOTH FLOUNDER	29	..	..	94
DOVER SOLE	..	5	71	33
ENGLISH SOLE	..	..	..	71
FLATHEAD SOLE	..	..	40	24
PACIFIC HALIBUT	..	2	..	..
PETRALE SOLE	..	..	..	14
REX SOLE	10	..	30	19
OTHER FLATFISH	..	..	..	..
S. alutus	965	..	..	..
S. babcocki	48	..	..	..
S. brevispinis	143	..	..	..
S. elongatus	3	..	..	..
S. entomelas	..	..	..	..
S. flavidus	..	9	..	707
S. paucispinis	191	46	..	..
S. pinniger	382	..	..	..
S. proriger	..	..	..	..
S. reedi	..	..	..	..
S. ruberrimus	..	..	..	..
S. zacentrus	478	..	..	..
Seb. alascanus	..	..	..	..
OTHER ROCKFISH	..	..	..	..
LINGCOD	..	35	15	94
PACIFIC COD	..	46	40	71
PACIFIC HAKE	..	1578	761	472
SABLEFISH	19	..	..	14
SALMON TROUT	..	..	..	..
WALLEYE POLLOCK	..	..	10	..
WOLF EEL	..	..	..	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	40	12
SKATES	..	..	202	142
SPINY DOGFISH	..	93	152	47
OTHER SELACHII	..	..	..	..
TOTAL CATCH (KG)	2268	1814	1361	1814

APPENDIX TABLE 3. DESCRIPTION OF ROCKFISH MATURITY STAGES.

Male codes	Description
1	Immature
2	Maturing (stringlike, translucent, white)
3	Developing (swelling, brown-white)
4	Developed (large, white; easily broken)
5	Running (running sperm)
6	Spent (flaccid, red)
7	Resting (ribbon-like; small, brown)
Female codes	
1	Immature
2	Maturing (small, pink ovary; translucent or opaque)
3	Mature (large, yellow eggs; opaque)
4	Fertilized (large, orange-yellow eggs; translucent)
5	Embryos or larvae (includes eyed eggs)
6	Spent (large, flaccid, red ovaries. A few larvae may be present)
7	Resting (moderate size, firm, red-grey ovaries)

APPENDIX TABLE 4. TOTAL CATCH BY SPECIES FOR TOWS ABOARD THE F/V HOWE BAY, JULY 24-31, AUGUST 24-29, 1985.

SPECIES NAME	WEIGHT (KG)	PERCENT
Arrowtooth flounder	2615.	6.82
Dover sole	294.	0.77
English sole	75.	0.20
Pacific halibut	60.	0.16
Petrale sole	30.	0.08
Rex sole	87.	0.23
S. alutus	4785.	12.48
S. babcocki	70.	0.18
S. borealis	70.	0.18
S. brevispinis	11254.	29.34
S. diploproa	90.	0.23
S. elongatus	39.	0.10
S. entomelas	1.	0.00
S. flavidus	1180.	3.08
S. helvomaculatus	1.	0.00
S. jordani	1.	0.00
S. paucispinis	1315.	3.43
S. pinniger	3125.	8.15
S. proriger	10295.	26.84
S. reedi	530.	1.38
S. ruberrimus	35.	0.09
S. zacentrus	804.	2.10
Seb. alascanus	109.	0.28
Lingcod	125.	0.33
Pacific cod	35.	0.09
Pacific hake	4.	0.01
Pacific tomcod	1.	0.00
Sablefish	1145.	2.99
Ratfish	39.	0.10
Skates	5.	0.01
Spiny dogfish	140.	0.37
	38359.	100.02

APPENDIX TABLE 5. TOTAL CATCH BY SPECIES FOR TOWS ABOARD THE F/V ARCTIC OCEAN JULY 28 - AUGUST 5, 1986.

SPECIES NAME	WEIGHT (KG)	PERCENT
Arrowtooth flounder	7418.	17.54
Dover sole	3368.	7.96
English sole	211.	0.50
Flathead sole	64.	0.15
Pacific halibut	404.	0.96
Petrale sole	61.	0.14
Rex sole	153.	0.36
S. alutus	1218.	2.88
S. babcocki	1143.	2.70
S. brevispinis	12492.	29.54
S. elongatus	40.	0.09
S. entomelas	83.	0.20
S. flavidus	2261.	5.35
S. paucispinis	1767.	4.18
S. pinniger	2511.	5.94
S. proriger	2469.	5.84
S. reedi	64.	0.15
S. ruberrimus	23.	0.05
S. zacentrus	619.	1.46
Seb. alascanus	15.	0.04
Lingcod	987.	2.33
Pacific cod	300.	0.71
Pacific hake	2837.	6.71
Sablefish	817.	1.93
Walleye pollock	25.	0.06
Ratfish	82.	0.19
Skates	405.	0.96
Spiny dogfish	455.	1.08
	42292.	100.00

APPENDIX TABLE 6. SAMPLE LENGTH FREQUENCIES AND MATURITIES FOR *S. brevispinis* BY LOCALITY, 1985.

					TOTAL	
AREA	13-24-04		03-24-04			
DATE	30/07/85		30/07/85			
DEPTH (M)	180		180			
SET	014		015			
	M	F	M	F	M	F
LENGTH (CM)						
35	0	0	0	0	0	0
36	0	0	0	0	0	0
37	0	0	0	0	0	0
38	0	0	0	0	0	0
39	0	0	0	0	0	0
40	0	0	0	0	0	0
41	0	1	0	0	0	1
42	2	0	0	0	2	0
43	4	2	0	0	4	2
44	3	0	3	3	6	3
45	7	4	1	2	8	6
46	9	9	9	5	18	14
47	9	11	11	6	20	17
48	13	15	11	12	24	27
49	7	14	20	14	27	28
50	22	12	32	20	54	32
51	17	19	18	20	35	39
52	7	13	17	18	24	31
53	12	8	14	14	26	22
54	5	12	8	9	13	21
55	10	7	6	8	16	15
56	6	10	3	6	9	16
57	4	7	1	3	5	10
58	3	6	3	2	6	8
59	2	6	0	1	2	7
60	0	0	0	4	0	4
61	0	0	0	3	0	3
62	0	0	1	0	1	0
63	0	1	0	0	0	1
64	0	1	0	0	0	1
65	0	0	0	0	0	0
66	0	0	0	0	0	0
TOTAL	142	158	158	150	300	408
MATURITIES						
1	4	0	0	0	4	0
2	0	25	0	15	0	40
3	0	2	0	0	0	2
4	9	3	1	2	10	5
5	0	19	0	49	0	68
6	0	68	1	61	1	129
7	129	41	156	23	285	64
8	0	0	0	0	0	0
9	0	0	0	0	0	0

APPENDIX TABLE 6 (CONTINUED)

AREA	04-24-02		04-25-02		04-25-02		04-25-02		TOTAL	
DATE	25/07/85		25/07/85		28/08/85		28/08/85			
DEPTH	174		177		178		166			
SET	002		003		028		029			
	M	F	M	F	M	F	M	F	M	F
LENGTH (CM)										
35	0	0	0	0	1	0	0	0	1	0
36	0	0	0	0	0	0	1	0	1	0
37	0	1	0	0	0	0	0	0	0	1
38	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	1	1	1	0	2	1
40	2	0	0	1	1	0	0	0	3	1
41	0	2	0	1	1	0	0	0	1	3
42	2	0	1	0	0	1	2	0	5	1
43	3	0	3	1	0	1	3	1	9	3
44	4	4	6	1	1	1	7	3	18	9
45	6	3	5	1	1	2	3	12	15	18
46	10	6	12	1	3	7	8	5	33	19
47	8	11	14	8	15	8	17	16	54	43
48	11	10	13	7	27	5	22	13	73	35
49	18	8	20	13	21	13	11	12	70	46
50	12	12	14	6	18	8	10	22	54	48
51	8	11	12	1	14	16	15	20	49	48
52	3	4	13	2	17	18	15	8	48	32
53	4	5	6	6	18	12	6	9	34	32
54	8	5	14	2	8	15	8	10	38	32
55	10	5	7	0	7	5	7	3	31	13
56	4	2	2	0	4	7	11	3	21	12
57	9	2	1	2	0	4	1	5	11	13
58	2	2	0	0	1	6	1	3	4	11
59	2	4	0	2	1	2	0	1	3	9
60	0	3	0	0	0	1	0	3	0	7
61	0	2	0	0	0	0	0	2	0	4
62	0	3	0	1	0	2	0	0	0	6
63	0	0	0	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0	1	0	1
65	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0
TOTAL	126	105	143	56	160	135	149	152	578	448
MATURITIES										
1	43	19	33	10	1	0	1	2	48	31
2	0	2	0	0	0	12	0	14	0	28
3	3	3	1	0	0	2	0	1	4	6
4	0	1	0	2	5	0	5	0	10	3
5	0	27	0	16	0	3	0	1	0	47
6	0	11	0	11	0	31	0	21	0	74
7	80	42	109	17	154	87	143	112	486	258
8	0	0	0	0	0	0	0	1	0	1
9	0	0	0	0	0	0	0	0	0	0

APPENDIX TABLE 6 (CONTINUED)

AREA	04-25-03		04-25-03		04-25-03		04-25-03		TOTAL	
DATE	26/07/85		26/07/85		27/08/85		27/08/85			
DEPTH	167		167		178		178			
SET	005		006		025		026			
	M	F	M	F	M	F	M	F	M	F
LENGTH (CM)										
35	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	1	0	1
39	0	0	0	0	0	0	0	0	0	0
40	0	1	0	0	0	0	0	0	0	1
41	1	0	0	0	0	0	0	1	1	1
42	0	1	0	1	1	0	1	0	2	2
43	1	1	2	1	0	0	0	1	3	3
44	3	3	0	2	1	0	1	0	5	5
45	2	3	2	3	2	0	2	0	8	6
46	3	8	4	5	4	4	0	2	11	19
47	9	9	4	5	4	4	5	3	22	21
48	12	13	9	2	9	3	10	9	40	27
49	6	10	7	9	13	12	4	13	30	44
50	7	12	12	14	20	10	16	16	55	52
51	5	11	3	13	14	17	15	17	37	58
52	9	7	4	12	11	12	20	22	44	53
53	6	10	4	7	17	11	15	22	42	50
54	5	6	3	3	18	13	12	14	38	36
55	5	6	7	7	14	11	16	6	42	30
56	2	4	8	5	8	13	10	6	28	28
57	5	5	4	7	10	9	12	7	31	28
58	1	1	1	5	2	11	2	8	6	25
59	1	3	0	2	0	11	0	5	1	21
60	0	2	2	3	1	4	1	8	4	17
61	0	1	3	3	0	3	0	0	3	7
62	0	1	0	3	0	0	0	3	0	7
63	0	1	0	3	0	1	0	0	0	5
64	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0
66	0	0	0	2	0	0	0	1	0	3
TOTAL	83	119	79	117	149	149	142	165	453	550
MATURITIES										
1	8	3	3	0	0	0	1	0	12	3
2	0	10	1	9	0	9	0	7	1	35
3	1	1	0	2	2	3	0	1	3	7
4	0	4	0	3	4	0	2	0	6	7
5	0	19	0	14	0	0	0	0	0	33
6	1	47	1	56	0	43	0	28	2	174
7	73	35	74	33	143	94	139	128	429	290
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

APPENDIX TABLE 6 (CONTINUED)

							TOTAL	
AREA	04-26-03		04-26-03		04-26-03			
DATE	28/07/85		28/07/85		26/08/85			
DEPTH	151		153		150			
SET	009		010		023			
	M	F	M	F	M	F	M	F
LENGTH (CM)								
35	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0
37	0	0	0	1	0	0	0	1
38	0	0	0	0	0	0	0	0
39	1	0	0	0	0	0	1	0
40	0	0	0	0	0	0	0	0
41	1	1	1	2	0	0	2	3
42	3	2	2	1	0	1	5	4
43	0	7	2	1	0	0	2	8
44	2	3	2	5	1	0	5	8
45	5	10	6	3	1	0	12	13
46	11	8	13	12	1	5	25	25
47	14	8	11	11	6	10	31	29
48	11	3	15	9	5	8	31	20
49	5	8	16	8	6	13	27	29
50	10	5	12	7	9	22	31	34
51	5	6	12	4	10	14	27	24
52	4	7	5	3	18	21	27	31
53	9	5	8	5	8	18	25	28
54	5	2	9	3	26	10	40	15
55	6	2	5	1	17	4	28	7
56	7	4	3	5	8	10	18	19
57	1	0	0	5	6	5	7	10
58	5	0	0	0	6	8	11	8
59	2	1	0	1	3	7	5	9
60	0	0	0	0	1	0	1	0
61	0	1	0	2	0	3	0	6
62	0	0	0	0	0	3	0	3
63	0	0	0	0	0	1	0	1
64	0	0	0	0	0	1	0	1
65	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0
TOTAL	107	83	122	89	132	164	361	336
MATURITIES								
1	4	0	3	0	0	0	7	0
2	0	30	0	24	0	16	0	70
3	1	1	0	2	4	0	5	3
4	0	0	7	3	0	0	7	3
5	0	2	0	8	0	0	0	10
6	0	28	1	33	0	47	1	108
7	102	22	111	19	128	101	341	142
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0

APPENDIX TABLE 6 (CONTINUED)

			TOTAL	
AREA	04-27-01			
DATE	24/08/85			
DEPTH	155			
SET	017			
	M	F	M	F
LENGTH (CM)				
35	0	0	0	0
36	0	0	0	0
37	1	1	1	1
38	0	0	0	0
39	0	0	0	0
40	0	1	0	1
41	2	0	2	0
42	2	1	2	1
43	3	1	3	1
44	5	1	5	1
45	8	6	8	6
46	12	7	12	7
47	18	18	18	18
48	12	14	12	14
49	11	18	11	18
50	9	14	9	14
51	11	17	11	17
52	17	19	17	19
53	10	15	10	15
54	6	14	6	14
55	8	8	8	8
56	0	5	0	5
57	0	3	0	3
58	0	1	0	1
59	0	2	0	2
60	0	0	0	0
61	0	0	0	0
62	0	0	0	0
63	0	0	0	0
64	0	0	0	0
65	0	0	0	0
66	0	0	0	0
TOTAL	135	166	135	166
MATURITIES				
1	2	0	2	0
2	0	26	0	26
3	1	2	1	2
4	17	1	17	1
5	0	1	0	1
6	0	24	0	24
7	115	112	115	112
8	0	0	0	0
9	0	0	0	0

APPENDIX TABLE 6 (CONTINUED)

			TOTAL		GRAND TOTAL	
AREA	03-24-07					
DATE	28/08/85					
DEPTH	183					
SET	031					
	M	F	M	F	M	F
LENGTH (CM)						
35	0	0	0	0	1	0
36	0	0	0	0	1	0
37	0	0	0	0	1	3
38	0	1	0	1	0	2
39	0	0	0	0	3	1
40	0	0	0	0	3	3
41	0	1	0	1	6	9
42	1	1	1	1	17	9
43	1	1	1	1	22	18
44	0	2	0	2	39	28
45	3	2	3	2	54	51
46	8	6	8	6	107	90
47	6	9	6	9	151	137
48	14	12	14	12	194	135
49	15	8	15	8	180	173
50	13	19	13	19	216	199
51	13	6	13	6	172	192
52	16	9	16	9	176	175
53	17	7	17	7	154	154
54	11	12	11	12	146	130
55	8	4	8	4	133	77
56	7	5	7	5	83	85
57	5	3	5	3	59	67
58	1	5	1	5	28	58
59	1	3	1	3	12	51
60	1	2	1	2	6	30
61	0	2	0	2	3	22
62	0	1	0	1	1	17
63	0	1	0	1	0	8
64	0	0	0	0	0	3
65	0	0	0	0	0	0
66	0	0	0	0	0	3
TOTAL	141	122	141	122	1968	1930
MATURITIES						
1	0	0	0	0	103	34
2	0	8	0	8	1	207
3	2	1	2	1	15	21
4	3	0	3	0	53	19
5	0	3	0	3	0	162
6	0	13	0	13	4	522
7	136	97	136	97	1792	963
8	0	0	0	0	0	1
9	0	0	0	0	0	0

APPENDIX TABLE 7. SAMPLE LENGTH FREQUENCIES AND MATURITIES FOR S. pinniger BY LOCALITY, 1985.

					TOTAL	
AREA	04-26-03		04-26-03			
DATE	28/07/85		28/07/85			
DEPTH	151		153			
SET	009		010			
	M	F	M	F	M	F
LENGTH (CM)						
32	0	0	1	0	1	0
33	0	0	0	0	0	0
34	0	0	0	0	0	0
35	0	0	0	0	0	0
36	0	0	0	0	0	0
37	1	0	0	0	1	0
38	1	2	0	0	1	2
39	3	1	1	0	4	1
40	7	1	0	0	7	1
41	4	4	1	0	5	4
42	5	9	1	0	6	9
43	2	5	2	1	4	6
44	3	5	0	0	3	5
45	5	0	0	1	5	1
46	4	5	3	0	7	5
47	7	4	4	0	11	4
48	11	2	3	0	14	2
49	16	3	2	3	18	6
50	7	2	2	0	9	2
51	7	1	1	2	8	3
52	6	2	2	0	8	2
53	11	5	0	2	11	7
54	3	5	0	3	3	8
55	2	1	0	1	2	2
56	0	2	0	0	0	2
57	0	0	1	1	1	1
58	0	0	0	1	0	1
59	0	0	0	0	0	0
60	0	0	0	0	0	0
61	0	0	0	2	0	2
TOTAL	105	59	24	17	129	76
MATURITIES						
1	6	13	1	0	7	13
2	0	22	0	2	0	24
3	29	12	8	14	37	26
4	68	0	15	0	83	0
5	0	0	0	0	0	0
6	1	3	0	0	1	3
7	1	9	0	1	1	10
8	0	0	0	0	0	0
9	0	0	0	0	0	0

APPENDIX TABLE 7 (CONTINUED)

					TOTAL		GRAND TOTAL	
AREA	03-24-07		03-24-07					
DATE	29/08/85		29/08/85					
DEPTH	165		165					
SET	032		033					
	M	F	M	F	M	F	M	F
LENGTH (CM)								
32	0	0	0	0	0	0	1	0
33	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	1	0
38	0	0	0	0	0	0	1	2
39	0	0	0	0	0	0	4	1
40	1	0	0	0	1	0	8	1
41	0	0	1	0	1	0	6	4
42	1	2	1	1	2	3	8	12
43	3	0	4	0	7	0	11	6
44	3	1	3	2	6	3	9	8
45	6	2	7	2	13	4	18	5
46	8	2	10	3	18	5	25	10
47	19	2	15	7	34	9	45	13
48	21	6	19	9	40	15	54	17
49	16	5	29	5	45	10	63	16
50	21	7	29	6	50	13	59	15
51	18	13	32	8	50	21	58	24
52	17	13	18	6	35	19	43	21
53	16	16	19	10	35	26	46	33
54	11	22	6	11	17	33	20	41
55	3	15	6	6	9	21	11	23
56	1	13	3	4	4	17	4	19
57	0	6	0	7	0	13	1	14
58	0	6	0	3	0	9	0	10
59	0	0	0	1	0	1	0	1
60	0	2	0	0	0	2	0	2
61	0	2	0	1	0	3	0	5
TOTAL	165	135	202	92	367	227	496	303
MATURITIES								
1	0	0	2	0	2	0	9	13
2	0	15	0	27	0	42	0	66
3	156	109	195	58	351	167	388	193
4	5	0	3	0	8	0	91	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	1	3
7	4	11	2	7	6	18	7	28
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0

APPENDIX TABLE 8. SAMPLE LENGTH FREQUENCIES AND MATURITIES FOR S. brevispinis BY LOCALITY, 1986.

AREA	04-25-02		04-25-02		04-25-02		04-25-02		TOTAL	
DATE	28/07/86		29/07/86		29/07/86		02/08/86			
DEPTH	178		170		166		166			
SET	004		005		006		025			
	M	F	M	F	M	F	M	F	M	F
LENGTH (CM)										
33	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	1	0	7	0	0	0
35	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0
37	0	1	0	0	0	0	0	0	0	1
38	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	2	0	1	0	3
40	0	0	0	0	1	0	0	0	1	0
41	0	0	0	0	0	0	0	0	0	0
42	1	1	0	0	1	0	1	1	3	2
43	2	4	1	3	4	3	0	0	7	10
44	5	5	1	3	6	7	1	2	13	17
45	7	7	3	0	7	10	4	1	21	18
46	10	7	5	5	7	10	1	1	23	23
47	11	5	4	3	8	9	3	2	26	19
48	8	4	6	5	8	21	5	2	27	32
49	8	7	5	12	3	8	6	4	22	31
50	3	6	2	4	13	18	9	9	27	37
51	6	7	4	5	9	16	7	6	26	34
52	5	3	5	11	11	15	6	6	27	35
53	5	2	7	12	8	12	9	5	29	31
54	3	0	3	3	4	16	14	8	24	27
55	1	1	2	4	7	8	15	14	25	27
56	2	2	11	1	4	3	8	6	25	12
57	0	0	3	2	4	4	7	9	14	15
58	0	1	5	3	7	3	6	7	18	14
59	1	0	2	3	4	5	0	9	7	17
60	0	1	0	5	1	10	1	1	2	17
61	0	0	0	0	0	0	0	2	0	0
62	0	0	0	0	0	1	0	1	0	2
63	0	0	0	3	1	1	0	1	1	5
64	0	0	0	0	0	0	0	1	0	1
65	0	0	0	1	0	1	0	1	0	3
66	0	0	0	0	0	0	0	0	0	0
TOTAL	78	64	69	89	118	190	103	100	368	443
MATURITIES										
1	1	0	1	0	2	0	4	6	8	6
2	9	9	2	7	18	24	0	0	29	40
3	1	8	0	4	0	8	0	0	1	20
4	0	2	0	0	0	0	0	0	0	2
5	0	8	0	5	0	21	0	1	0	35
6	0	0	0	0	0	0	0	0	0	0
7	67	37	66	73	98	137	99	93	330	340
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

APPENDIX TABLE 8 (CONTINUED)

					TOTAL	
AREA	04-25-03		04-25-03			
DATE	29/07/86		29/07/86			
DEPTH	189		185			
SET	008		009			
	M	F	M	F	M	F
LENGTH (CM)						
33	0	0	0	0	0	0
34	0	0	3	0	10	0
35	0	0	0	0	0	0
36	0	0	1	0	1	0
37	0	1	0	0	0	1
38	0	0	0	1	0	1
39	0	0	0	0	0	0
40	0	0	0	0	0	0
41	1	0	2	1	3	1
42	0	1	1	1	1	2
43	2	3	1	3	3	6
44	6	2	2	2	8	4
45	1	1	4	2	5	3
46	6	2	1	6	7	8
47	2	4	8	5	10	9
48	13	7	6	7	19	14
49	7	8	4	10	11	18
50	12	12	16	24	28	36
51	13	16	9	24	22	40
52	11	10	11	14	22	24
53	15	13	7	23	22	36
54	16	9	9	11	25	20
55	13	10	13	16	26	26
56	6	5	2	7	8	12
57	5	8	4	12	9	20
58	5	7	6	8	11	15
59	0	1	1	7	1	8
60	1	5	0	3	1	8
61	0	0	0	4	0	0
62	0	5	0	3	0	8
63	0	1	0	5	0	6
64	0	0	0	1	0	1
65	0	0	0	2	0	2
66	0	1	0	0	0	1
TOTAL	135	135	108	202	243	337
MATURITIES						
1	7	3	14	6	21	9
2	11	5	3	5	14	10
3	0	1	0	2	0	3
4	0	0	0	5	0	5
5	0	71	0	123	0	194
6	0	1	0	0	0	1
7	117	54	91	61	208	115
8	0	0	0	0	0	0
9	0	0	0	0	0	0

APPENDIX TABLE 8 (CONTINUED)

			TOTAL	
AREA	04-26-03			
DATE	30/07/86			
DEPTH	169			
SET	010			
	M	F	M	F
LENGTH (CM)				
33	1	0	1	0
34	0	0	7	0
35	1	0	1	0
36	0	0	0	0
37	0	1	0	1
38	0	0	0	0
39	0	3	0	3
40	1	1	1	1
41	0	0	0	0
42	2	0	2	0
43	2	5	2	5
44	10	3	10	3
45	5	3	5	3
46	9	7	9	7
47	13	12	13	12
48	19	17	19	17
49	8	18	8	18
50	9	12	9	12
51	11	19	11	19
52	6	18	6	18
53	2	5	2	5
54	7	8	7	8
55	5	4	5	4
56	7	6	7	6
57	3	3	3	3
58	7	5	7	5
59	1	4	1	4
60	1	4	1	4
61	0	3	0	0
62	0	0	0	0
63	0	2	0	2
64	0	1	0	1
65	0	1	0	1
66	0	0	0	0
TOTAL	130	165	130	165
MATURITIES				
1	18	17	18	17
2	1	9	1	9
3	1	5	1	5
4	0	4	0	4
5	0	14	0	14
6	0	0	0	0
7	110	116	110	116
8	0	0	0	0
9	0	0	0	0

APPENDIX TABLE 8 (CONTINUED)

									TOTAL	
AREA	04-27-02		04-27-02		04-27-02		04-27-02			
DATE	30/07/86		30/07/86		31/07/86		01/08/86			
DEPTH	170		174		170		170			
SET	012		013		015		023			
	M	F	M	F	M	F	M	F	M	F
LENGTH (CM)										
33	0	0	0	0	0	0	0	0	0	0
34	0	0	2	0	4	0	1	0	3	0
35	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0
39	1	0	0	0	0	0	0	0	1	0
40	0	0	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0	0	0
42	2	0	0	0	0	1	0	0	2	1
43	1	1	3	0	0	0	0	0	4	1
44	4	0	1	0	3	0	1	1	9	1
45	2	6	1	0	5	2	1	0	9	8
46	5	4	1	1	2	3	2	2	10	10
47	7	6	2	3	12	5	3	1	24	15
48	11	7	6	2	12	4	8	3	37	16
49	15	7	6	4	8	6	12	6	41	23
50	17	11	14	6	21	7	8	11	60	35
51	14	6	13	6	17	12	10	11	54	35
52	17	7	8	5	21	7	8	7	54	26
53	20	12	10	4	11	6	5	2	46	24
54	21	9	12	7	20	12	12	4	65	32
55	15	2	5	6	8	7	11	5	39	20
56	6	9	1	7	14	8	8	4	29	28
57	4	6	1	3	7	10	7	9	19	28
58	3	6	1	9	3	4	1	9	8	28
59	1	8	1	0	0	9	1	3	3	20
60	0	4	0	5	0	7	0	4	0	20
61	0	0	0	0	0	0	0	1	0	0
62	0	2	0	3	0	3	0	0	0	8
63	0	0	0	2	0	2	0	0	0	4
64	1	1	0	1	0	1	0	0	1	3
65	0	0	0	0	0	0	0	1	0	1
66	0	0	0	0	0	0	0	0	0	0
TOTAL	167	116	86	78	164	117	98	84	515	395
MATURITIES										
1	11	1	9	0	12	0	8	4	40	5
2	1	10	1	0	0	6	0	0	2	16
3	0	2	0	2	0	5	0	0	0	9
4	0	2	0	2	0	0	0	0	0	4
5	0	27	0	18	0	4	0	8	0	57
6	0	0	0	0	0	0	0	0	0	0
7	155	74	76	56	152	102	90	72	473	304
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

APPENDIX TABLE 8 (CONTINUED)

AREA	05-11-04		05-11-04		05-11-04		TOTAL		GRAND TOTAL	
DATE	31/07/86		31/07/86		01/08/86					
DEPTH	162		120		125					
SET	018		020		021					
	M	F	M	F	M	F	M	F	M	F
LENGTH (CM)										
33	0	0	0	0	0	0	0	0	1	0
34	0	0	0	0	2	0	8	0	2	0
35	0	0	0	0	0	0	0	0	1	0
36	0	0	0	0	0	0	0	0	1	0
37	1	0	0	1	0	0	1	1	1	4
38	0	0	0	0	0	0	0	0	0	1
39	1	0	0	0	0	0	1	0	2	6
40	2	3	1	1	0	0	3	4	5	5
41	6	2	5	3	0	1	11	6	14	7
42	6	1	4	1	2	0	12	2	20	7
43	3	4	5	3	1	1	9	8	25	30
44	5	5	9	8	1	0	15	13	55	38
45	8	7	11	7	3	1	22	15	62	47
46	11	9	11	10	3	1	25	20	74	68
47	14	9	10	10	14	4	38	23	111	78
48	22	14	16	15	9	8	47	37	149	116
49	21	13	13	12	11	4	45	29	127	119
50	13	19	9	4	12	5	34	28	158	148
51	9	11	8	11	13	6	30	28	143	156
52	6	9	7	8	6	10	19	27	128	130
53	7	5	7	5	12	6	26	16	125	112
54	5	10	10	8	7	8	22	26	143	113
55	4	8	7	5	6	10	17	23	112	100
56	1	3	4	7	9	13	14	23	83	81
57	1	5	4	5	11	16	16	26	61	92
58	0	6	2	10	3	9	5	25	49	87
59	0	1	2	9	2	18	4	28	16	77
60	0	2	0	5	0	10	0	17	4	66
61	0	0	0	0	0	7	0	9	0	37
62	0	0	0	3	0	4	0	7	0	25
63	0	0	0	1	0	0	0	1	1	18
64	0	0	0	0	0	0	0	0	1	6
65	0	0	0	0	0	0	0	0	0	7
66	0	0	0	0	0	0	0	0	0	1
TOTAL	146	146	145	154	125	142	416	442	1672	1782
MATURITIES										
1	35	29	41	38	12	18	88	85	175	122
2	0	2	0	1	0	2	0	5	46	80
3	0	1	0	3	0	2	0	6	2	43
4	0	2	0	2	0	2	0	6	0	21
5	0	1	1	5	0	0	1	6	1	306
6	0	0	0	0	0	0	0	0	0	1
7	111	111	103	105	113	118	327	334	1448	1209
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

APPENDIX TABLE 9. SAMPLE LENGTH FREQUENCIES AND MATURITIES FOR S. pinniger BY LOCALITY, 1986.

			TOTAL	
AREA	03-24-07			
DATE	28/07/86			
DEPTH	167			
SET	001			
	M	F	M	F
LENGTH (CM)				
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	4	1	4	1
41	5	2	5	2
42	7	1	7	1
43	6	6	6	6
44	13	1	13	1
45	15	8	15	8
46	11	8	11	8
47	21	9	21	9
48	11	5	11	5
49	12	8	12	8
50	7	4	7	4
51	6	12	6	12
52	6	5	6	5
53	3	4	3	4
54	0	5	0	5
55	0	3	0	3
56	1	4	1	4
57	0	2	0	2
58	0	1	0	1
59	0	1	0	1
60	0	0	0	0
61	0	0	0	0
TOTAL	128	90	128	90
MATURITIES				
1	0	0	0	0
2	5	14	5	14
3	120	53	120	53
4	0	16	0	16
5	0	0	0	0
6	0	0	0	0
7	3	7	3	7
8	0	0	0	0
9	0	0	0	0

APPENDIX TABLE 9 (CONTINUED)

			TOTAL	
AREA	04-25-02			
DATE	29/07/86			
DEPTH	166			
SET	006			
	M	F	M	F
LENGTH (CM)				
35	1	1	1	1
36	0	0	0	0
37	1	0	1	0
38	0	0	0	0
39	2	2	2	2
40	5	4	5	4
41	3	3	3	3
42	8	5	8	5
43	13	7	13	7
44	12	6	12	6
45	9	5	9	5
46	16	9	16	9
47	14	5	14	5
48	19	5	19	5
49	15	5	15	5
50	18	4	18	4
51	13	7	13	7
52	9	8	9	8
53	10	9	10	9
54	5	17	5	17
55	2	7	2	7
56	0	5	0	5
57	0	8	0	8
58	0	4	0	4
59	0	1	0	1
60	0	0	0	0
61	0	2	0	2
TOTAL	175	129	175	129
MATURITIES				
1	4	1	4	1
2	9	38	9	38
3	161	36	161	36
4	0	46	0	46
5	0	0	0	0
6	0	0	0	0
7	1	8	1	8
8	0	0	0	0
9	0	0	0	0

APPENDIX TABLE 9 (CONTINUED)

			TOTAL		GRAND TOTAL	
AREA	03-23-12					
DATE	04/08/86					
DEPTH	183					
SET	029					
	M	F	M	F	M	F
LENGTH (CM)						
35	0	1	0	1	1	2
36	0	0	0	0	0	0
37	0	0	0	0	1	0
38	0	1	0	1	0	1
39	1	0	1	0	3	2
40	2	4	2	4	11	9
41	6	2	6	2	14	7
42	9	2	9	2	24	8
43	9	9	9	9	28	22
44	9	10	9	10	34	17
45	11	9	11	9	35	22
46	17	16	17	16	44	33
47	13	7	13	7	48	21
48	15	9	15	9	45	19
49	9	15	9	15	36	28
50	3	6	3	6	28	14
51	2	4	2	4	21	23
52	3	5	3	5	18	18
53	2	2	2	2	15	15
54	2	2	2	2	7	24
55	1	0	1	0	3	10
56	0	0	0	0	1	9
57	0	0	0	0	0	10
58	0	1	0	1	0	6
59	0	0	0	0	0	2
60	0	0	0	0	0	0
61	0	0	0	0	0	0
TOTAL	114	105	114	105	417	324
MATURITIES						
1	22	66	22	66	26	67
2	0	2	0	2	14	54
3	92	34	92	34	373	123
4	0	1	0	1	0	63
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	2	0	2	4	17
8	0	0	0	0	0	0
9	0	0	0	0	0	0